

ellipsoid or oblong separating into 2 carpels. Species 180, chiefly Old World mountains, a few in the Andes and Australasia.

(1) *G. malayana* Ridl. *Journ. Linn. Soc.* xxxviii. 316.

One to 3 in. tall. Leaves fleshy lanceolate sessile acute, .25 to .5 in. long. Flowers terminal, solitary, .5 in. long. Calyx-lobes acuminate, longer than corolla. Corolla bright blue (occasionally white), lobes sub-spathulate, rounded. Ovary stalked; style short. *Hab.* High mountains in moss and on damp rocks, at 5000 to 6000 ft. altitude. Pahang, Gunong Tahan (Robinson, Ridley).

4. MICRORPHIUM, Clarke.

Erect, much-branched pubescent herb. Leaves alternate except a few distant pairs. Flowers numerous in unilateral-branched cymes, pedicelled. Calyx campanulate, 2-lipped; lobes 5. Corolla small, white; tube campanulate, lobes 5, contort in bud. Stamens 5, exsert, dehiscing longitudinally. Ovary 1-celled; style linear. Capsule ovoid. Seeds ovoid. Species 1.

(1) *M. pubescens* Clarke, *Journ. As. Soc. Beng.* lxxiv. 88.

One to two ft. tall, much-branched, grey pubescent; stem-leaves 2 in. long, 1 in. across, upper ones smaller, oblanceolate, tip rounded, base narrowed into petiole. Pedicels .25 in. long. Calyx .2 in. long. Corolla .25 in. across; lobes rounded. Capsule ovoid, .2 in. long. *Hab.* On rocks. Lankawi islands, Tanjong Sirih (Curtis); Dayong Bunting (Robinson).

5. CRAWFURDIA, Wall.

Glabrous climbers. Leaves opposite, 3-nerved, petioled. Flowers solitary, axillary, large. Calyx tubular; teeth linear, long 5 or 4. Corolla tubular, funnel-shaped; lobes short. Stamens 5 on corolla-tube. Ovary stalked, 1-celled; placentas parietal; style linear; stigmas 2. Berry ellipsoid. Species about 12, Indo-Malaya, Manchuria.

(1) *C. Blumii* G. Don, *Syst.* iv. 200; Clarke, *l.c.* 90. (Fig. 112, p. 435.)

Slender climber 4 to 5 ft. long. Leaves ovate-lanceolate acute, base round or narrowed, 1.5 to 1.75 in. long, .5 in. wide; petioles .35 in. long. Flowers sub-sessile. Calyx-lobes .5 in. long, narrow. Corolla 1.25 to 1.5 in. long, yellow with purple longitudinal lines. Fruit oblong ellipsoid, .6 in. long, purple, succulent. *Hab.* High mountains climbing on bushes, Pahang, Tahan mountain up to 5500 or 6000 ft. altitude. Perak, Gunong Kerbau 6600 ft. altitude (Robinson). *Distrib.* Java, Sumatra.

6. VILLARSIA, Vent.

Floating herbs. Leaves long-petioled, ovate. Peduncles solitary, 1- to many-flowered. Calyx deeply 5-lobed. Corolla

campanulate; lobes sub-rotate. Stamens 5, from the corolla-tube. Ovary 1-celled; style short; stigma bilobed. Capsule globose, 1-celled, 4-valved at tip. Species 12, Africa and Australia.

(1) *V. aurantiaca* Ridl. in Clarke, l.c. 90.

A small stoloniferous plant forming a tuft 2 in. long. Leaves long petioled .35 in. across, round, ovate-cordate, edge sinuate; petioles .5 to 2 in. long. Peduncles solitary 1 to 2 in. long, 1-flowered. Calyx .17 in. long, lobes oblong-lanceolate. Corolla orange yellow, .25 in. across. Capsule sub-globose, .12 in. long. *Hab.* Rare in mud by buffalo wallows, usually terrestrial. Pahang at Kwalla Pahang (Ridley).



FIG. 112.—*Crawfordia Blumii*.

7. LIMNANTHEMUM, Gmel.

Aquatic floating herbs with sessile ovate cordate leaves. Flowers on numerous peduncles in the axils of the leaf, white or yellow. Sepals 4 to 6, oblong. Corolla rotate, 4- to 5-lobed, lobes ciliate fimbriate. Stamens 4 to 6 on the tube; anthers sagittate. Capsule oblong or globose, dehiscing irregularly. Species about 20, tropical and temperate regions.

- | | |
|---|---------------------------|
| Leaves orbicular, 3 to 8 in. across; petals ciliate | (1) <i>L. indicum</i> |
| Leaves ovate, .75 in. across | (2) <i>L. parvifolium</i> |

(1) **L. indicum** *Thwaites, Enum. 205; Clarke in Hook. fl. F.B.I. iv. 131.*

Aquatic plant; stems long, rooting at nodes. Leaves floating, orbicular cordate, 3 to 7 in. long and wide, rather thick, light green; pedicels from the notch in the leaf about 20, slender, 3 in. long in flower, lengthening later. Calyx-lobes 6, linear-lanceolate, green, .25 in. long. Petals 6, linear, thickly fimbriate, white, .5 in. long, connate at the base, which is yellow. Stamens 6;



FIG. 113.—*Limnanthemum indicum*.

filaments thick, yellow, acute; anthers black. Ovary free, green, rounded bluntly sub-angled; style stout; stigma fimbriate, white. Capsule .25 to .3 in. long, sub-quadrate. *Hab.* In ponds, ditches, and sluggish rivers, Singapore, Reservoir. Johor, Sempang Kiri. Malacca, near Durian Tungul. Lankawi (Curtis). Perlis, Chupeng. *Distrib.* India, China, Malaya.

(2) **L. parvifolium** *Griseb. DC. Prodr. ix. 141; Clarke in Hook. fl. F.B.I. iv. 132.*

A small tufted plant. Leaves basal spatulate or obovate, narrowed to the petiole, blade .25 to 1 in. long; petioles broad, .5 in. long. Floating leaves ovate-cordate or hastate, 1 in. long and wide; petioles slender, 6 in. long. Pedicels about 15 in the

notch, .25 in. long in flower, lengthening to .5 in. long. Sepals lanceolate-linear. Petals very small, white, obovate fimbriate. Capsule oblong, beaked with the style-base .12 in. long. *Hab.* Ponds. Not common. Pahang, Kwala Pahang, Malacca (Cum-
ing). Tringganu (Yapp). Rahman, Kota Bharu (Gwynne
Vaughan). Lankawi (Curtis). *Distrib.* India, Siam, Ceylon.

ORDER XCV. HYDROPHYLLACEÆ.

Herbs. Leaves radical or alternate (rarely opposite) entire or lobed. Flowers in scorpioid cymes axillary or terminal, regular. Calyx inferior, lobes 5 or more. Corolla funnel or cup-shaped,



FIG. 114.—*Hydrolea zeylanica*.

lobes 5 imbricate or twisted. Stamens 5, on base of corolla-tube; filaments filiform. Ovary 1-celled; placentas 2, free or parietal or 2-celled, with placentas adnate to septum; ovules 2 to many in a cell; styles filiform, bifid or simple or 2 free from base. Capsule bivalved. Seeds oblong, 2 to many on placenta. Species about 130, chiefly American.

1. *HYDROLEA*, Linn.

Herbs. Leaves entire, alternate. Flowers blue in racemes or cymes terminal. Calyx-lobes lanceolate divided nearly to base. Corolla campanulate rotate, lobes imbricate. Stamens 5, anthers sagittate. Ovary 2-celled, placentas adnate to dissepiment; styles 2 (or 3). Capsule globose or ovoid, septicial 2- to 4-valved.

Seeds minute. Species 14, American except 1 China, 1 Indo-Malaya, 1 African.

(1) *H. zeylanica* Vahl. *Symb.* ii. 46; *King, Journ. As. Soc. Beng.* lxxiv. ii. p. 276. (Fig. 114, p. 437.)

Creeping, ascending herb, branched, 6 to 12 in. tall, glandular-pubescent above. Leaves thin lanceolate, .5 to 2 in. long, .2 to .5 in. wide; petioles winged to base. Flowers .5 in. across, bright blue, on racemes on short branch ends. Petals ovate. Capsule ovoid shorter than calyx, 2-lobed. Seeds very many. *Hab.* Muddy spots in rice-fields and ditches, open country. Singapore, Gelang beneath coconuts in ditches. Perak, Padang Rengas; Asam Kumbang (Wray). Perlis, Kanga (Ridley). *Distrib.* Tropical Asia, Africa, America, Australia.

ORDER XCVI. BORAGINÆÆ.

Herbs, shrubs or trees. Leaves alternate (rarely opposite). Flowers in scorpioid dichotomous cymes sometimes paniced and rarely solitary axillary, bisexual. Calyx inferior, 5-lobed (rarely 8-lobed), usually persistent in fruit. Corolla gamopetalous; tube funnel-shaped or cylindric; lobes 5, rarely more imbricate. Stamens as many as lobes, insert on tube; filaments slender. Ovary superior, cells 2, with 2 ovules in each or 4 with 1 ovule; style occasionally twice bifid; stigma entire or bilobed. Fruit drupaceous with a hard 2- or 4-celled endocarp, or dividing into 2 to 4 nutlets. Species about 1500, whole world. (*King, Journ. As. Soc. Beng.* lxxiv. 277.)

Style twice partite; calyx enlarging in fruit; trees or shrubs	1. CORDIA
Styles simple short, shortly bilobed; pyrenes 2, 2-seeded scandent herbaceous or stout shrub	2. TOURNEFORTIA
Style long dilated at top; pyrenes 4, 1-seeded; herbs	3. HELIOTROPIMUM
Style long bifid at top. Trees or shrubs	4. EHRETIA
Styles nearly separate, prostrate herb; flowers often solitary	5. COLDENIA

1. CORDIA, Linn.

Trees or shrubs. Leaves alternate. Flowers in dichotomous cymes scorpioid or in clusters, polygamous. Calyx tubular accrescent in fruit. Corolla funnel-shaped or campanulate, white or orange; lobes 4 to 8. Stamens as many as lobes; anthers hastate exsert. Ovary 4-celled, cells 1-ovuled; style long, bipartite; branches bifid. Fruit ovoid surrounded by the enlarged calyx; putamen bony, cells 1 to 4, only 1 seed. Species 280, tropics.

Leaves large; fruit large with large calyx.

Flowers large.

Fruit covered by calyx (1) **C. subcordata**

Fruit half covered by calyx (2) **C. premnifolia**

Flowers small white; fruit pink.

Leaves ovate-cordate blunt or sub-acute (3) **C. obliqua**

Leaves ovate-lanceolate acuminate, base cuneate. (4) **C. Griffithii**

(1) **C. subcordata** Lam. Ill. 1899; King, l.c. 278.

Big but low-branching tree. Leaves membranous, ovate acute, base round; nerves 4 to 5 pairs; 3·5 to 6·5 in. long, 2·5 to 4 in. wide; petioles 2 in. long. Corymbs few-flowered, about 1 in. long; pedicels slender, .25 in. long. Calyx cylindric, .4 in. long, teeth 3, triangular. Corolla 1 in. long, funnel-shaped, lobes 6, round bright orange. Fruit globose, when dry pyramidal acute, 4-angled, 1 in. long enclosed in the large inflated calyx. *Hab.* Seashores, not common. Perak (Scortechini). Dindings, Pangkor (Curtis). Penang, Batu Feringhi (Curtis). Kedah, Pulau Song Song, Pulau Adang. *Distrib.* Indo-Malaya to Polynesia.

(2) **C. premnifolia** Ridl. Journ. Roy. As. Soc. S. Br. 68, p. 12.

Tree; young branches, petioles and nerves pubescent. Leaves coriaceous ovate-blunt or sub-acute, base round or cordate, undulate or serrulate, 6·5 in. long, 4 in. wide. Cymes 1 in. long, 3-branched. Flowers unknown. Fruit ovoid-globose, pulpy yellow, .75 in. long, putamen oblong, acute, 6-ridged, 3-celled. Calyx cup-shaped, .25 in. long, .5 in. across, irregularly lobed, hairy. *Hab.* River banks open country, local, Pahang River, Tanjong Antan (Ridley, Burn-Murdoch); Kwala Lipis (Machado). *Native name*: Sekundai.

(3) **C. obliqua** Willd. *Phytog.* 4, t. iv. *C. myxa* King, l.c. 279 (not of Linné).

Tree 40 to 50 ft. tall or less. Leaves thin coriaceous ovate, sub-acute or blunt, base round or sub-cordate, 2 to 3 in. long, 1·5 to 2 in. wide; petioles slender, 1 in. long. Cymes trichotomous, .5 in. long. Calyx campanulate, .25 in. long. Corolla white, tube shorter than calyx. Fruit ellipsoid, light dirty pink, .5 in. long, very glutinous, enlarged calyx campanulate, .2 in. long; mouth crenulate. *Hab.* Planted about towns, but I think wild in Pahang and Perak. Singapore about town; Pongol; Changi. Malacca, cult. (Maingay); Pahang, Sungei Jelai, Kwala Lipis (Machado). Perak, Temengoh. *Distrib.* Tropical Asia. *Native names*: Sekundah; Sekendai.

(4) **C. Griffithii** Clarke in Hook. fil. F.B.I. iv. 139.

A small tree about 30 ft. tall. Leaves thin coriaceous, ovate-lanceolate acute, acuminate, base slightly cuneate, 1·5 to 3·5 in. long, 1 to 1·75 in. wide; petioles .65 to 1·25 in. long. Cymes slender, spreading; peduncle .5 to 3 in. long; branches lax, .5 to 2 in. long. Flowers white, .4 in. long, sub-sessile. Calyx funnel-shaped, mouth oblique, teeth 5. Corolla funnel-shaped, twice as long, lobes narrow, longer than tube. Stamens 5. Fruit pink. *Hab.*

Open country; not common. Malacca, by the old Chapel (Griffith, Maingay). Selangor, Kwala Selangor; Port Swettenham (Burkill). Kedah (Kunstler).

2. *TOURNEFORTIA*, Linn.

Trees or shrubs almost herbaceous. Leaves alternate. Cymes scorpioid usually terminal. Flowers numerous, small. Calyx 4- to 5-lobed. Corolla white or green, tube cylindric, lobes 4 to 5. Stamens as many included. Ovary 4-celled; style short bilobed; ovules 1 in each cell. Drupe small, ovoid, thinly fleshy separating into 2, 2-seeded or 4, 1-seeded pyrenes. Species about 130, all tropics.

Stout sea-coast tree; panicle large silvery hairy . . . (1) *T. argentea*
Scandent herbaceous shrub, glabrous (2) *T. Wallichii*

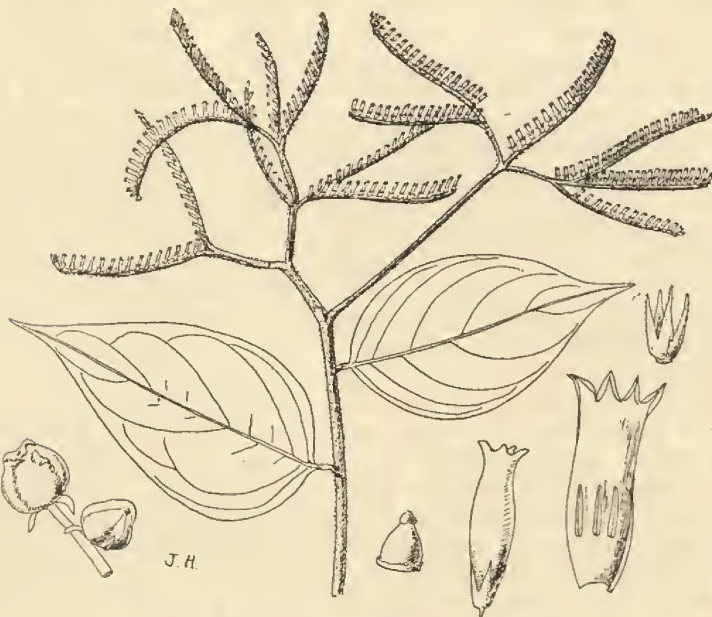


FIG. 115.—*Tournefortia Wallichii*.

(1) *T. argentea* Linn. *fil. Suppl.* 132. *Clarke in Hook. fil. F.B.I.* iv. 145.

A stout densely silky large shrub. Leaves obovate-lanceolate acute silky, 6 in. long, 2 in. wide, decurrent to base of petiole. Panicle 6 in. long and wide of very many sessile flowers. Calyx .05 in. long. Corolla .1 in. long, lobes ovate crenulate. Drupes .25 in. through, coriaceous. *Hab.* Rare. On sea-coasts, curiously rare in this region. Adang Islands, Pulau Nipis (Ridley). *Distrib.* Ceylon, Nicobars, Malay islands, Australia, Mauritius.

(2) **T. Wallichii** DC. *Prodr.* ix. 527; *King, l.c.* 281. (Fig. 115, p. 440.)

A nearly herbaceous climber. Leaves fleshy-membranous, dark green, ovate acute, base round, 2 to 3.5 in. long, .75 to 1.75 in. wide; petioles .3 to .4 in. long. Cymes terminal and axillary; peduncle 2 in. long, dichotomously branched with several branches; spikes scorpioid, about 1 in. long (longer in fruit). Flowers .3 in. long, sessile, numerous. Calyx .05 in. long. Corolla-tube 4-angled, teeth 4 ovate, green. Fruit .2 in. long, 4-grooved. *Hab.* Common in damp shady spots. Singapore, Reservoir; Changi; Jurong. Johor, Bukit Murdom, Batu Pahat (Kelsall). Selangor, Petaling; Kwala Lumpur (Curtis). Perak (Kunstler). Penang, Penara Bukit (Curtis). *Distrib.* South Siam, Java, Borneo, Sumatra.

3. HELIOTROPIUM, Linn.

Herbs hairy. Leaves alternate. Flowers white or violet in terminal dichotomous scorpioid cymes. Calyx of 5 narrow lobes. Corolla-tube cylindric, lobes imbricate. Stamens 5, included; filaments short. Ovary 4-celled, 4-ovuled. Fruit dry of 4 nutlets. Species about 225, whole world, but chiefly American.

(1) **H. indicum** Linn. *Sp. Pl.* 130; *King, l.c.* 281.

Herb about 1 to 1.5 ft. tall, little-branched, hairy. Leaves ovate or ovate-lanceolate acute, base cordate, 1.5 to 2 in. long, .75 to 2 in. wide; petioles .5 in. long. Cymes about 2 in. long, gradually lengthening. Flowers .15 in. long. Corolla pale violet, centre white, with yellow eye. Fruit .1 in. long, conic, of 4 pear-shaped beaked pyrenes. *Hab.* Common weed in waste ground. Singapore, Johor, Malacca (Griffith). Pahang, Pekan. Kelantan, Perak, Penang. *Distrib.* Asia, Africa, and America. *Native names:* Rumput Oleh; Seri Bumi; Jinkin Kala.

EXCLUDED SPECIES

H. STRIGOSUM Willd. "In all the provinces by waysides not common," *King, l.c.* 282. I have never seen a single plant of this from anywhere in our area.

4. EHRETIA, Linn.

Shrubs or small trees. Leaves alternate or dentate. Flowers small, white in axillary or terminal corymbs or panicles, rarely 1-flowered, axillary. Calyx 5-lobed. Corolla-tube short, lobes 5, blunt imbricate. Stamens 5, exsert. Ovary 2-celled, 2-ovuled in each; style bifid. Drupe small, globose, 4(or 1- to 3-)seeded dividing into 2 bilocular or 4 unilocular pyrenes. Species 50, tropical.

Leaves thin coriaceous or membranous; flowers paniced.

Leaves ovate or elliptic-oblong, acuminate, 5-nerved. (1) **E. timorensis**

Leaves obovate, blunt 7- to 8-nerved . . . (2) **E. parallela**

Leaves stiffly coriaceous, small; flowers solitary . . . (3) **E. buxifolia**

(1) *E. timorensis* DeC. *Nouv. Ann. Mus. Hist. Nat.* iii. 395. *E. lævis* Roxb. *Cor. Pl.* i. 42, *t.* 55; *var. timorensis* Clarke in *Hook. fil. F.B.I.* iv. 142; *King, l.c.* 283.

Shrub or small tree 12 ft. or more tall. Leaves coriaceous, ovate to elliptic-oblong, shortly acuminate, base slightly cuneate, 2.5 to 5 in. long, 1.25 to 2.25 in. wide; petioles .4 in. long. Cymes corymbose, many-flowered, axillary and terminal, puberulous, about 2 in. long and 5 in. across. Flowers numerous, sessile, scorpioid. Calyx under 1 in. long. Corolla white, tube .1 in. long, lobes short. Fruit globose pulpy, yellow .2 in. through, calyx very small with acute teeth. *Hab.* Uncommon in woods. Malacca (Maingay); Relau at the base of Mt. Ophir; Panchur (Derry). Perak (Scortechini). Kelantan, Kwala Krai, Kelantan River (Ridley). *Distrib.* Burma, Malay isles and Australia. *Native names:* Gombah yem; Medang Saminiyak.

This appears to be specifically very distinct from Roxburgh's plant.

(2) *E. parallela* Clarke, *l.c.* iv. 143; *King, l.c.* 284.

Shrub, glabrous except inflorescence. Leaves obovate or obovate-elliptic, base cuneate; nerves 7 to 8 pairs; 1.5 to 1.75 in. long, .75 to 1 in. wide; petioles .25 in. long. Flowers and inflorescence as in preceding, but smaller. *Hab.* Penang (Curtis). Rare.

(3) *E. buxifolia* Roxb. *Cor. Pl.* i. 42, *t.* 57; *Clarke, l.c.* iv. 144.

A low stiff shrub. Leaves small stiff scabrid coriaceous, often 3-lobed at the tip, base narrowed, sub-sessile obovate. Peduncles axillary 1 (or few)-flowered hairy, .75 in. long or less. Calyx-lobes lanceolate-linear. Corolla .25 in. across campanulate, lobes ovate. Drupe .13 in. across globose, pyrene 1- to 4-seeded. *Hab.* Dry sandy spots, local. Pahang, Pekan, open country (Ridley). *Distrib.* India, Malay isles to Formosa.

5. *COLDENIA*, Linn.

Much-branched prostrate herb. Leaves alternate, crisped. Flowers very small, axillary, sub-sessile solitary or in short cymes. Calyx 4- to 5-lobed. Corolla funnel-shaped, lobes 4 or 5. Ovary ovoid, 2-celled with 2 ovules in each cell or 4-celled with 1 ovule in each; styles 2, distinct at base, united above; stigmas 2, capitate. Fruit of 4 one-seeded pyrenes. Species 12, all American but 1 African, 1 cosmopolitan.

(1) *C. procumbens* Linn. *Sp. Pl.* 125; *King, l.c.* 284.

Whole plant lying flat on ground, 6 in. to 1 ft. or more long, hairy all over. Leaves elliptic-obovate, deeply blunt serrate, .5 to 1 in. long, .24 in. wide; petioles .15 in. long. Flowers very small, yellow. Fruit .1 in. long, ovoid pyramidal before splitting. *Hab.* Sandy places; local and rare; chiefly in the north, Pahang, Pekan. Kedah, Alor Sta, common. Perlis, Kanga (Ridley). *Distrib.* Tropics generally.

ORDER XCVII. CONVULVULACEÆ.

Twining herbs or climbing lianes (rarely erect), occasionally prostrate herbs. Leaves alternate (or *Cuscuta* none). Flowers regular bisexual in cymes or solitary. Sepals 5, imbricate, sometimes accrescent. Corolla campanulate or funnel-shaped, rarely tubular; lobes usually short on a wide limb, sometimes long. Stamens 5, adnate to corolla-tube; anthers oblong. Carpels 2, connate in a superior ovary; disc annular; cells 2 or 4; style 1 (rarely 2); stigma capitate or 2-lobed. Fruit a berry, or 2- to 4-valved capsule. Seeds 2 to 4, rarely 1 only. Species 1000, whole world. (Prain, *Journ. As. Soc. Beng.* lxxiv. 284.)

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| Parasitic leafless yellow or pinkish plant. | 1. CUSCUTA |
| Green climbing leafy twiners herbaceous or shrubby. | |
| <i>Woody climbers (rarely erect).</i> Flowers small white; petals bilobed; fruit fleshy or pulpy, indehiscent. | 2. ERYCIBE |
| <i>Half woody climbers.</i> Flowers large, pink, white or purple, lobes obscure. | |
| Fruit a dry berry. | |
| Ovary 4-celled; leaves silvery silky. | 3. ARGYREIA |
| Ovary 2-celled; leaves usually hairy or glabrous. | 4. LETTSOMIA |
| Fruit capsular, dehiscent. | |
| Capsule surrounded by a broad circular wing; flowers racemose small. | 5. NEUROPELTIS |
| <i>Twiners not woody.</i> Capsule not winged; flowers solitary or cymose. | |
| Styles free or partially united at base. | |
| Prostrate herb; flowers blue, small. | 6. EVOLVULUS |
| Twiner; flowers large cream, centre purple; flowers sub-capitate. | 7. BONAMIA |
| Style entire; stigmas 2. | |
| Ovary 1-celled. | |
| Bracts enveloping calyx. | 8. CALYSTEGIA |
| Bracts not enveloping calyx. | 9. HEWITTIA |
| Ovary 2- or 4-celled. | |
| Outer 3 sepals larger than inner 2, decurrent on peduncle. | |
| Flowers white. | 10. ANISEIA |
| Sepals sub-equal, not decurrent. | |
| Flowers small bluish or blue, campanulate; capsule 8-valved. | 11. JACQUEMONTIA |
| Flowers yellow, campanulate; capsule 4-valved. | 12. MERREMIA |
| Ovary 1- to 3-celled; flowers white, blue or pink; corolla funnel-shaped. | 13. IPOMÆA |
| Flowers small, yellow urceolate, base swollen, above tubular. | 14. LEPISTEMON |

1. CUSCUTA, Linn.

Leafless twining yellowish parasites. Flowers small, white or pink in small heads. Sepals 5 or 4. Corolla ovoid or campanu-

late with a ring of lobed scales in the mouth. Stamens 4 or 5, adnate to corolla. Ovary 2-celled; ovules 4; styles 2 (or 1); stigmas 2. Fruit a globose or ovoid capsule. Seeds 2 to 4. Species 80, temperate tropical regions.

(1) *C. hygrophilæ* Pearson *l.c.* Pl. t. 2704; Prain, *l.c.* 286.

Flower-heads .25 in. across. Sepals connate at base, .1 in. long. Corolla .15 in. across, greenish white, campanulate; lobes ovate round. Stamens 5. Corolla-scales fimbriate. Styles 2. Fruit .15 in. across, top flat and depressed. *Hab.* Waste ground, parasitic on *Hygrophila*. Singapore, Payah Lebar, and Victoria Street. Johor town, near the saw-mills (Ridley).

Prain thinks it is a form of *C. chinensis*, but the sepals are not keeled as in that species.

2. ERYCIBE, Roxb.

Climbing shrubs rarely erect. Leaves elliptic, coriaceous. Flowers small, white or yellow, in axillary and terminal panicles or racemes, usually tomentose. Sepals 5, orbicular coriaceous, tomentose. Corolla small; tube and triangular centre of lobes on back, dark brown-hairy; lobes obcordate 5. Stamens 5, included, adnate to throat; filaments short. Ovary globose, 1-celled; ovules 4; stigma large, sessile globose or conic, 5- or 10-ridged. Fruit a pulpy or leathery drupe, ellipsoid or ovoid. Species about 30, Indo-Malaya.

Leaves pubescent beneath.

Cymes dense paniced, long-peduncled, axillary . (1) *E. strigosa*

Cymes dense sessile, axillary; branches very thick; leaves 3 in. across . (2) *E. magnifica*

Cymes dense sessile, axillary; leaves large oblanceolate; flowers yellow . (3) *E. citriniflora*

Panicle terminal; nerves and midrib only hairy. (4) *E. expansa*

Panicles short dense axillary; leaves at length glabrous.

Flowers numerous, racemed, hardly peduncled; fruit oblong . (5) *E. Princei*

Flowers few cymose; peduncles .5 in. long; fruit globose . (6) *E. malaccensis*

Leaves quite glabrous.

Leaves very small, 1.75 in. long or less; flowers solitary axillary . (7) *E. leucoxyloides*

Leaves medium; flowers in axillary cymes; corolla glabrous inside.

Leaves thick coriaceous; fruit warty . (8) *E. ænea*

Leaves thin coriaceous; fruit scurfy . (9) *E. Griffithii*

Leaves 2.5 in. wide, thin coriaceous; nerves 7 to 9 pairs . (10) *E. festiva*

Leaves larger, stiff coriaceous, 6 or fewer; fruit over 1 in. long, oblong, smooth . (11) *E. sapotacea*

Leaves thick coriaceous; corolla hairy inside . (12) *E. præcipua*

Leaves large, over 3 in. across.

Erect shrub; flowers few, nearly glabrous . (13) *E. glomerata*

Climbing; branches 4-angled; flowers numerous small . . . (14) *E. angulata*

Climbing; branches terete; flowers numerous; fruit ovoid, 1 in. long . . . (15) *E. Stapfiana*

(1) *E. strigosa* Prain, *Journ. As. Soc. Beng.* lxxv. (2), 536; lxxiv. 288.

Liane 40 to 50 ft. long, 1 to 2 in. through; branches black, tomentose. Leaves thinly coriaceous elliptic cuspidate-acuminate or ovate-lanceolate, base cuneate; nerves 5 pairs, fine elevate; glabrous above, finely black-tomentose beneath, 3 to 4 in. long, 1.5 to 1.75 in. wide; petioles .75 in. long. Panicles dense, brown tomentose; axillary peduncles 1.5 in. long or less. Flowers crowded in dense cymes, .5 to 1 in. long, brown-pubescent. Sepals orbicular. Corolla white, .3 in. across. *Hab.* Perak, Thaiping (Kunstler). Rare.

(2) *E. magnifica* Prain, *Journ. As. Soc. Beng.* lxxiii. (2), 18; lxxiv. 289.

A stout liane 100 ft. long, 2 to 3 in. through, densely brown-tomentose. Leaves elliptic, stiffly coriaceous, glabrous above, dense brownish green, tomentose beneath, tip round, base slightly narrowed round; nerves very prominent beneath about 10 pairs; 8 to 10 in. long, 3.5 to 4 in. wide; petioles .35 in. long. Racemes axillary, dense sessile, 1 to 2 in. long, sometimes crowded. Sepals orbicular, velvety-brown. Corolla .5 in. across, white or yellow. Fruit ellipsoid, 1.25 in. long, densely velvety-brown. *Hab.* Perak, Larut (Kunstler). Rare.

(3) *E. citriniflora* Griff. *Notulæ* 4, p. 284. *E. Wallichii* Prain and Hallier, *Bull. Herb. Boiss.* 5, p. 382.

Climbing shrub. Leaves oblanceolate coriaceous, base narrowed obtuse or acute; nerves hairy when young and elevate beneath, 10 to 12 pairs; 6 to 9 in. long, 3 to 3.75 in. wide; petioles thick, curved, .5 in. long. Cymes crowded or solitary, axillary, .75 to 1 in. long; pedicels .1 in. long, like the sepals and peduncles hairy. Sepals obovate-orbicular, hairy on edges. Corolla outside hairy, about .5 in. across, yellow, smelling of tree-bugs. *Hab.* Open country in the north. Penang, Waterfall (Curtis). Kedah, Alor Sta (Ridley). *Distrib.* Tenasserim.

(4) *E. expansa* Wall. *Cat.* 1331; Prain, *Journ. As. Soc. Beng.* lxxiv. 289.

Woody climber densely red-tomentose. Leaves elliptic, usually blunt with a short sharp point, base rounded, sub-coriaceous, glabrous above, red-pubescent chiefly on nerves 2 to 3 pairs fine, conspicuous beneath; 2 to 2.5 in. long, 1 to 1.5 in. wide; petioles red-pubescent, .15 in. long. Panicles terminal, 5 in. long, of close short branches of cymes .75 in. long or less, 2 longer peduncled in 2 upper axils, all red brown-tomentose. Sepals orbicular, tomentose. Corolla .45 in. across, pinkish white. *Hab.* Lankawi, Kwala Kwah (Curtis). *Distrib.* Tenasserim, South Siam.

(5) **E. Princei** Wall. Cat. 1335; *Prain*, l.c. 290.

Long but not stout, woody climber. Leaves obovate-oblong, shining green, coriaceous, shortly abrupt-acuminate, base slightly narrowed blunt, glabrous on both sides but midrib in young pubescent; nerves fine, 5 to 7 pairs, not prominent; 2.5 to 4 in. long, 1.75 in. wide; petioles .2 in. long, pubescent. Racemes dense, axillary brown-tomentose, 1 in. long, many-flowered, terminal racemes leafless. Sepals orbicular, brown-pubescent. Corolla .4 in. across, white, fragrant. Fruit ellipsoid, orange turning black. *Hab.* Very common on hedges and edges of woods in the south. Singapore, Jurong; Bukit Timah; Tanglin, etc. Johor, Kwala Sembrong (Kelsall). Malacca, Bukit Sabukor; Bukit Bruang; Brisu. Negri Sembilan, Bemban (Cantley). *Distrib.* Bangka, Sumatra, Borneo. *Native names:* Akar Sakijang; Akar Purut Kijang; Akar Purut Kerbau. The plant gives its name to St. John's Island (Malay, Pulau Sakijang).

(6) **E. malaccensis** Clarke in Hook. fil. F.B.I. iv. 182; *Prain*, l.c. 291.

Climber nearly glabrous except branchlets and petioles. Leaves elliptic or oblong, short blunt acuminate, base cuneate, thinly coriaceous, adult quite glabrous; nerves fine, 5 to 6 pairs, reticulations visible; 3 to 3.5 in. long, 1.5 in. wide; petioles .25 in. long, pubescent. Cymes axillary pubescent of 5 or 6 flowers on a peduncle .2 in. long. Sepals orbicular tomentose. Corolla white, .35 in. across. Fruit ellipsoid, orange, then purple. *Hab.* Common in woods. Singapore, Changi. Malacca, Merlimau (Cantley); Batu Tiga; Bukit Bruang (Derry); Bukit Sabukor. Perak, Larut (Kunstler). Penang, Waterfall (Curtis). *Native name:* Akar Serawan Jantan.

(7) **E. leucoxyloides** *Prain*, l.c. lxxiii. (2), 16; lxxiv. 292.

Slender low bushy climber; branchlets tomentose. Leaves deep green, oblong-ovate; base round, tip narrowed, blunt, glabrous; nerves faint, 3 pairs; 1.5 in. long, .4 to .6 in. wide; petioles .1 in. long. Flowers white, fragrant, solitary, axillary; pedicels .2 in. long. Sepals pubescent in centre. Corolla .5 in. across. Fruit elliptic, .6 in. long. *Hab.* Open country, often forming large clumps. A pretty plant. Singapore, Changi; Garden Jungle; Holland Road. Johor town. Selangor, Kwala Lumpur (Curtis).

(8) **E. ænea** *Prain*, *Journ. As. Soc. Beng.* lxxiii. (2), 85; lxxiv. 295.

Big liane. Stem 70 to 100 ft. long, 3 to 4 in. through; branchlets tomentose. Leaves thickly coriaceous, glabrous narrow-oblong or elliptic, base cuneate, tip narrowed blunt; nerves 5 to 7 pairs sunk on both sides; 2.5 to 5 in. long, 1 to 2 in. wide; petioles .25 in. long. Cymes .25 to 1.2 in. long, axillary, 3- to 20-flowered, tomentose. Sepals closely tomentose. Corolla pale yellow, .5 in.

across. Fruit elliptic, warty grey, .9 in. long. *Hab.* Perak, Larut, 300 to 2500 ft. altitude (Kunstler).

(9) **E. Griffithii** Clarke, *l.c.* iv. 182; Prain, *l.c.* 295. *E. Maingayi* Clarke, *l.c.*

Climber 60 to 80 ft. long, 4 to 6 in. through; branchlets pubescent. Leaves elliptic, blunt cuspidate, base narrowed usually blunt, sub-coriaceous, glabrous; nerves slender, elevate, 6 to 8 pairs; 2.75 to 6 in. long, .75 to 2.5 in. wide; petioles .25 in. long. Cymes solitary or clustered, 4- to 9-flowered, .3 in. long, pubescent; peduncles .2 to .3 in. long; pedicels .25 in. long. Sepals pubescent. Corolla cream-colour, .5 in. wide; lobes narrow. Fruit coriaceous, scurfy outside, 1 to 1.5 in. long. *Hab.* Not rare. Hedges and woods. Singapore, Bukit Timah Road (Hullett); Changi. Malacca (Maingay). Perak, Larut (Kunstler). Penang (Curtis). *Distrib.* Tenasserim, Sumatra, Philippines.

(10) **E. festiva** Prain, *l.c.* lxiii. (2), 87; lxxiv. 292.

Woody climber, glabrous except flowers. Leaves thinly coriaceous, elliptic, long acuminate, base cuneate; nerves fine but distinct, 7 to 9 pairs; 3 to 6 in. long, 1.5 to 2.5 in. wide; petioles .5 in. long. Cymes .5 in. long, pubescent. Flowers 7 to 12. Sepals pubescent. Corolla greenish white, .75 in. across. *Hab.* Forests. Not common. Singapore, Garden Jungle. Malacca, Selendor (Cantley). Perak, Larut (Kunstler).

(11) **E. sapotacea** Hallier and Prain, *Journ. As. Soc. Beng.* lxxiii. (2), 16; lxxiv. 293.

Stout climber, glabrous. Leaves elliptic, base shortly cuneate, short blunt acuminate, coriaceous; nerves 6 pairs prominent beneath as are reticulations; 6 in. long, 3 in. wide; petioles .5 in. long. Cymes small, axillary, .24 in. long, about 4-flowered. Flowers scurfy puberulous. Fruit oblong-ovoid acute, 2 in. long, 1 in. through; epicarp sub-woody. *Hab.* Penang Hill near the Cooly Lines (Curtis). Rare and little known.

(12) **E. præcipua** Prain, *Journ. As. Soc. Beng.* lxiii. (2), 86; lxxiv. 294.

Big climber, glabrous. Leaves narrow elliptic, base cuneate, narrowed at both ends, thick coriaceous; nerves 5 pairs, obscure; 1.5 to 4 in. long, .75 to 2 in. wide; petioles .3 in. long. Cymes axillary 5- to 8-flowered, .5 in. long, rusty-pubescent; pedicels .12 in. long. Sepals rusty-pubescent. Corolla white, .5 in. across, lobes very narrow. Fruit ovoid .7 to .75 in. long. *Hab.* Forests. Perak, Larut (Kunstler). Penang Hill (Curtis).

(13) **E. glomerata** Bl. *Bijdr.* 1047; Prain, *l.c.* 294. *E. albida* Prain, *Journ. As. Soc. Beng.* lxiii. (2), 87.

A shrub or small tree, 10 to 20 ft. tall. Leaves elliptic or narrow-oblong, coriaceous, glabrous, dark green above, yellow green beneath; nerves 8 to 9 pairs, slender, faint; midrib stout; 7 to 12 in. long, 1.75 to 5 in. wide; petioles .15 to .35 in. long.

Cymes glomerate, 5- to 8-flowered, sub-sessile axillary. Sepals nearly glabrous, pale green. Corolla .5 in. across, white, lobes narrow.

var. *typica*. Leaves elliptic, 3.5 to 5 in. wide. *Hab.* Mountains, Perak, Gunong Bubu, 2500 to 3000 ft. altitude (Kunstler); Bujong Malacca; Waterloo (Curtis).

var. *longifolia* Bl., l.c. Leaves cuneate-oblong to 2.25 in. wide. *Hab.* Perak, Thaiping Waterfall (Wray); Tea Gardens, Lankawi, Sungei Batu Asap (Haniff). *Distrib.* Java, Borneo.

(14) *E. angulata* Prain, *Journ. As. Soc. Beng.* lxiii. (2), 84; lxxiv. 291.

Big liane 100 ft. long, 4 to 6 in. through; branchlets angular, pubescent. Leaves coriaceous, obovate, base cuneate, tip round or short-acuminate; 4 to 8 in. long, 2 to 4 in. wide, quite glabrous; nerves 5 to 8 pairs elevate, slender; petioles .5 in. long, pubescent. Flowers rather small in axillary panicles, 1 to 6 in. long, and terminal, 7 to 10 in. long, many-flowered; rachis angular tomentose. Sepals outer, tomentose. Corolla white, .5 in. across. *Hab.* Selangor, Batu Tiga. Perak near Gunong Bubu (Kunstler); Dipang (Scortechini). *Distrib.* Sumatra. *Native name*: Akar Tampang Ari.

(15) *E. Stapfiana* Prain, *Journ. As. Soc. Beng.* lxiii. (2), 87; lxxiv. 293.

Woody climber 15 to 20 ft. to 100 ft. long, 3 in. through, glabrous. Leaves oblong or elliptic to narrow lanceolate, base short cuneate, apex short abrupt acuminate, coriaceous; nerves 4 to 6 pairs strong elevate beneath, transverse nervules and reticulations very fine; 4 to 7 in. long, 2 to 3 in. wide; petioles .25 in. long. Panicles solitary or fascicled, brown tomentose, axillary, 1 to 2 in. long, many-flowered. Pedicels .1 in. long. Sepals small, dense, tomentose. Corolla white, lobes narrow, .5 in. across. Fruit ovoid, .6 to .8 in. long, dark velvety-brown. *Hab.* Perak, Batang Padang District and Larut (Kunstler and Scortechini). *Distrib.* Tenasserim.

3. ARGYREIA, Lour.

Climbing or sub-erect shrubs. Leaves cordate ovate to lanceolate, silky. Cymes many-flowered, peduncled axillary. Sepals 5, herbaceous, in fruit leathery, red inside, silky outside. Corolla large, funnel-shaped, rose pink, more or less hairy outside, limb plicate, shortly 5-lobed. Stamens 5, included. Disc annular. Ovary 4-celled; ovules 4; style filiform; stigma biglobose. Fruit a dry berry. Seeds 4 in a mealy pulp. Species 30, Old World tropics. *A. speciosa* Sweet, the elephant creeper, a very large species with big pink flowers is often cultivated and covers old walls in Malacca.

Leaves oblong blunt	.	.	.	.	.	(1) <i>A. obtusifolia</i>
Leaves lanceolate acute	.	.	.	.	.	(2) <i>A. mollis</i>

(1) **A. obtusifolia** Lour. *Fl. Cochinchine* 135; *Prain, l.c.* 320.

Large climber. Leaves elliptic or oblong blunt or obtuse, base cuneate, pilose above, silky strigose beneath, 5 in. long, 1 to 3 in. wide; petioles .6 to .8 in. long or longer. Peduncles 3 to 6 in. long. Cymes of 4 or 5 flowers; pedicels .1 to .2 in. long. Sepals 5, ovate blunt, .25 in. long, silky outside, red inside. Corolla 1.5 in. long, tubular-campanulate, hairy outside. Capsule .4 in. long, globose chartaceous. Seeds grey-velvety hemispheric. *Hab.* Perak (Scortechini). Lankawi (Curtis). *Distrib.* Indo-China, Tenasserim, Hongkong.

(2) **A. mollis** Choisy, *Conv. Or.* 38. *Lettsomia argentea* Ridl. *Journ. F.M.S. Mus.* vii. 47.

Shrubby climber covered with silvery hairs all over. Leaves lanceolate, mucronulate acuminate blunt, narrowed to base, subcoriaceous, silky all over, .3 in. long, 1 in. across; petioles .5 in. long. Cymes lax, silky, 3- to 4-flowered; peduncle .5 in. long. Sepals (in flower .3 in. long, elliptic blunt, silky hairy. Corolla 2.5 in. long, white with pink edge hairy outside). Sepals, in fruit thinly white silky orbicular, sub-equal, glabrous inside. Berry globose, 2-celled with thick red pulp. *Hab.* Kedah Peak at 2500 to 3000 ft. altitude (Robinson).

This fruiting specimen much resembles some specimens of *A. mollis* of Java. As the berry is distinctly 2-celled, and not 4-celled (given as the character of *Lettsomia*), I referred it to that genus. The habit, however, silky covering and fruit not projecting from sepals, make it more like *Argyreia*. I refer it with some doubt (until better specimens are obtained) to *A. mollis*. The description in brackets is taken from Javanese specimens.

4. LETTSOMIA, Roxb.

Climbers, shrubby, hairy or strigose. Leaves cordate or truncate, usually ovate. Cymes capitate or corymbose. Bracts conspicuous, often large. Sepals orbicular or elliptic, thickened, coriaceous in fruit. Corolla funnel-shaped campanulate, purple, pink or white; lip plicate, tube hairy on ridges on outside of tube. Stamens 5. Disc annular or cupular. Ovary 2-celled; ovules 4. Stigma biglobose. Fruit pulpy, usually oblong. Species about 210, Africa and Asia. This genus is very near *Argyreia* and passes into it. It has been referred to that genus by botanists.

Cymes capitate, bracts large.

- | | |
|---|-----------------------------|
| Seeds 4 | (1) L. peguensis |
| Seeds 1 or 2 only. | |
| Bracts orbicular blunt | (2) L. sphærocephala |
| Bracts lanceolate acuminate. | |
| Corolla 2.25 in. long, purple; leaves sparse hairy on nerves only | (3) L. Maingayi |
| Corolla 1.25 in. long, white tinted pink; leaves hairy beneath all over | (4) L. Ridleyi |

Cymes lax, bracts small.

Sepals lanceolate acute (5) **L. adpressa**

Sepals ovate or orbicular.

Sepals irregular, inner ones wider and emarginate (6) **L. Curtisii**

Sepals regular.

Corolla over 1 in. long.

Sepals and leaves nearly glabrous . . . (7) **L. penangiana**

Sepals grey silky; leaves hairy beneath . . . (8) **L. Scortechinii**

Corolla under 1 in. long.

Whole plant reddish or yellowish tomentose (9) **L. rubicunda**

Whole plant sparingly strigose, hairy or slightly pubescent (10) **L. Kunstleri**

(1) **L. peguensis** Clarke in Hook. fil. *F.B.I.* iv. 193; Prain, l.c.

322.

A villous twiner. Leaves ovate to sub-orbicular, cordate acute, densely soft hairy all over, 4 to 6 in. long, 1.5 to 3.5 in. wide; petioles 1.5 in. long or longer. Cymes capitate; peduncles 5 to 9 in. long. Bracts elliptic-oblong, 1 in. long, dense hairy. Outer sepals elliptic, inner lanceolate hairy. Corolla funnel-shaped, hairy outside, 2 in. long, base white, above pink or mauve with dark centre. Berry brown; .25 in. through. *Hab.* Not rare; in forests. Negri Sembilan, Bukit Danan; Bukit Burunang (Cantley). Selangor, Batu Caves; Petaling in open country; Klang Gates. Perak, Ulu Kerling and Goping (Kunstler); Track to Jor. Province Wellesley, Permatang Bertam. Penang, Balik Pulau. Kelantan, Chaning by the river. *Distrib.* Burma, Sumatra, Java. *Native names:* Akar Ulan Bukit; Akar Tumiang; Akar Tapah rusa; Akar Lana Bulu.

(2) **L. sphærocephala** Prain, *Journ. As. Soc. Beng.* lxxiii. (2), 19; lxxiv. 323.

Twiner; stems slightly angled, sparsely hairy. Leaves ovate-lanceolate or oblong to acuminate, base rounded, sparsely hairy, 4 to 5 in. long, 1.5 in. across; petioles 1 in. long. Cymes capitate-globose, 2 in. across with large orbicular purple involucre bracts, 1.5 in. across, sparsely hairy outside, on slender peduncles 2 to 12 in. long. Inner floral bracts sub-orbicular to spatulate. Sepals glabrous except tips. Corolla pink, funnel-shaped, softly hairy outside, .75 to 1 in. long. *Hab.* Perak, Krian, Abu Salama, Gunong Arang Paya (Scortechini).

(3) **L. Maingayi** Clarke, l.c. iv. 195; Prain, l.c. 323.

Twiner, rather stout, hairy, bristly. Leaves ovate or elliptic, base round, acute or short acuminate, glabrous except a few hairs beneath, 5 to 7 in. long, 3 to 4 in. wide; petioles .5 to 1 in. long. Cymes capitate, 2 to 3 in. across; peduncles .25 in. long, bristly hairy. Bracts involucre bracts ovate-lanceolate, .6 in. across, sparsely hairy outside, purple smooth within. Sepals linear-lanceolate long acuminate, .75 in. long, bristly. Corolla tubular-campanulate,

mauve violet, 2.25 in. long, hairy outside. Berry succulent, ellipsoid, .75 in. long. Seed one. *Hab.* Forests. Johor, Sedenak. Pahang, Kota Glanggi. Malacca, base of Mt. Ophir (Hullett). Selangor, Kwala Lumpur. Perak, Songkai River (Curtis); Changkat Mentri (Kloss). *Native names*: Akar Trong-Trong; Akar K'lupus; Akar Sumulut; Tentarong; Akar Ulan Gajah.

(4) **L. Ridleyi** Prain, *Journ. As. Soc. Beng.* lxxiii. (2), 98; lxxiv. 324.

Large twiner sparsely hairy. Leaves elliptic-acuminate, glabrous above; nerves hairy beneath; 5.5 in. long, 3.5 in. wide; petioles 1 to 3 in. long. Cymes capitate, 8- to 10-flowered, 1.5 in. across. Bracts involucrel ovate acute, hairy below, glabrous above, .8 in. long, .25 in. wide. Peduncles 2 to 6 in. long. Sepals ovate-lanceolate, pubescent. Corolla white tinted pink, funnel-shaped, 1.25 in. long, hairy outside. Berry ovoid, .5 in. long, pink. *Hab.* Local in damp forests. Singapore, Bukit Mandai; Chan Chu Kang. Johor, Kota Tinggi; Kwala Tebing Tinggi; Batu Pahat; Gunong Pulai. Negri Sembilan. Gunong Talan (Cantley). Selangor, Kwala Lumpur. *Native name*: Akar Saga Molek.

var. *velutina* Prain, *l.c.* Leaves beneath, petioles and bracts densely hairy. Singapore, Bukit Mandai; Chua Chu Kang; Reservoir Woods (Ridley).

(5) **L. adpressa** Miq. *Flor. Ind. Bat.* ii. 591; Prain, *l.c.* 324.

Hairy twiner. Leaves elliptic, softly hairy both sides, base round or cuneate, tip acute, 4 to 5 in. long, 2 to 2.5 in. wide; petioles 1.5 in. long. Cymes rather open, few-flowered, 2 in. across, on hairy peduncles, .5 to 1.5 in. long. Bracts not involucrel, lanceolate, hairy, .3 in. long. Sepals .6 in. long, lanceolate, hairy. Corolla tubular-campanulate, 1.25 in. long, white with pink stripes to claret colour. Berry ellipsoid, pink. *Hab.* Hill Forests. Selangor, Semangkok Pass. Perak, B'landa Mabok (Wray). Penang Hill and Penara Bukit (Porter, Curtis, Maingay and all collectors). Lankawi, Gunong Raya (Haniff).

(6) **L. Curtisii** Prain, *Journ. As. Soc. Beng.* lxxiii. (2), 100; lxxiv. 325.

Glabrous climber. Leaves elliptic acuminate glabrous above except hairy midrib, adpressed hairy beneath, 4 to 5 in. long, 2.5 to 3 in. wide; petioles 3 in. long, glabrous. Cymes compound, 12- to 16-flowered, 3 in. wide; peduncles 4 to 10 in. long, glabrous. Sepals coriaceous, .25 in. long, outer sparsely hirsute, round; inner wider emarginate, glabrous. Berry ovoid, .75 in. long. *Hab.* Rare. Selangor, Kwala Lumpur (Curtis).

(7) **L. penangiana** Miq. *Flor. Ind. Bat.* iii. 592; Prain, *Journ. As. Soc. Beng.* lxxiv. 325. (Fig. 116, p. 452.)

Slender woody climber nearly glabrous. Leaves elliptic-oblong, base round or (young) cuneate, acute, chartaceous, a few

long hairs on midrib or quite glabrous, 6 in. long, 2.5 in. wide; petioles .1 in. long. Cymes lax, about 10-flowered, 1 in. long on slender peduncles 5.5 in. long or less. Sepals ovate blunt, rough appressed hairy, .2 in. long. Corolla tubular-campanulate, hairy outside, 1.5 in. long, dark purple or plum colour. Berry ovoid, .6 in. long, .3 in. wide, rose pink. *Hab.* Mountain forests. Selangor, Semangkok Pass. Perak, Thaiping Hills to 5000 ft. altitude (all collectors); Tupai (Wray). Penang Hill (all collectors).



FIG. 116.—*Lettsomia penangiana*.

var. *reticulata* Prain, *l.c.* 325. Leaves stiffer; nerves and reticulations prominent beneath. Perak near Ulu Kerling (Kunstler).

(8) **L. Scortechinii** Prain, *Journ. As. Soc. Beng.* lxiii. (2), 98; lxxiv. 326.

Slender woody climber; stems sparsely pubescent. Leaves ovate acute, sub-coriaceous, sparsely hairy beneath, 2 to 3 in. long, 1 to 2 in. wide; petioles .5 to 1 in. long. Cymes 3- to 8-flowered, corymbose, 1 to 1.5 in. across; peduncles 5 in. long or less, minutely pubescent. Sepals orbicular, grey-tomentose, .25 in. across (in fruit .3 in. across), the inner the biggest. Corolla 1.5 in. long, white with mauve centre, funnel-shaped, campanulate

tomentose on bands of tube. Berry ellipsoid, pink, .5 in. long. *Hab.* Mountain forests. Perak, Thaiping Hills from 2500 to 5000 ft. altitude (Scortechini, Ridley).

(9) **L. rubicunda** *Clarke, l.c.* iv. 195; *Prain, l.c.* 326.

A strong climber, fulvous-tomentose. Leaves sub-coriaceous, reddish-tomentose beneath (yellow when dry), 5 to 7 in. long, 2 to 4 in. wide; petioles stout, 1 to 2 in. long, tomentose. Cymes corymbose, 1.5 to 4 in. across, entirely tomentose as is the peduncle, 3.5 to 7 in. long. Sepals .2 in. wide in flower, .3 in. across in fruit, orbicular tomentose; the inner the smaller. Corolla .75 in. long, funnel-shaped, tawny-tomentose outside, white, tube violet mauve, inside dark purple. Berry ellipsoid, .75 in. long. *Hab.* Malacca, Forests at Rim (Griffith, Maingay). Kelantan, Chaning (Ridley). *Distrib.* Burma.

(10) **L. Kunstleri** *Prain, Journ. As. Soc. Beng.* lxxiii. (2), 100; lxxiv. 327.

A finely tomentose climber. Leaves ovate acuminate, base rounded, densely appressed, soft hairy beneath or glabrous except the elevate nerves beneath, 3.5 to 5.5 in. long, 2 to 3 in. wide; petioles 1 in. long. Cymes 1 to 3 in. across; peduncles 5 to 8 in. long, all hairy. Sepals orbicular sub-equal, 3 outer pubescent, .15 in. long. Corolla white outside and hairy-pink inside, .5 in. long. Berry ovoid, 5 in. long, red. *Hab.* Forests. Malacca and Negri Sembilan (Cantley). Selangor, Batu Caves; Sungei Buluh; Semangkok Pass; Bukit Kutu. Perak, Goping and Chanderiang (Kunstler); Kwala Dipang near Kampar and Waterloo; Ulu Selama (Scortechini). *Distrib.* Sumatra.

5. NEUROPELTIS, Wall.

Climbing shrub. Leaves chartaceous. Flowers small, in axillary racemes (or terminal panicles). Bracteole ovate-lanceolate eventually forming the fruit-wing. Sepals 5, orbicular. Corolla small, white, tube campanulate, lobes 5. Stamens adnate to tube. Ovary 2-celled; ovules 4. Fruit a small 4-valved capsule, 1-seeded in the centre of an oblong orbicular, papery wing (the enlarged bracteole). Species 2, Indo-Malaya.

(1) **N. racemosa** *Wall. Cat.* 1322; *Prain, l.c.* lxxiv. 297.

Stout shrub climbing. Leaves elliptic-lanceolate acuminate-acute, base shortly cuneate, 2.5 to 5 in. long, 1.25 to 2.25 in. wide, pubescent beneath; petioles .25 in. long. Racemes 2 to 3 in. long, pendulous, tomentose. Sepals red-villous. Corolla .3 in. across, lobes ovate as long as tube. Fruit ovoid, .25 in. long, with the bracteolar wing orbicular, 1 to 1.75 in. long surrounding it. *Hab.* Woods. Singapore (Wallich). Malacca, Merlimau (Cantley); Batu Ampat (Goodenough). Negri Sembilan, Gunong Berimbun (Cantley). Penang (Jack and Porter, *Herb. Wall.*).

Distrib. South India, Borneo, Burma. *Native names* : Akar Oran Merah; Akar China putih.

6. EVOLVULUS, Linn.

Little prostrate herbs with small distichous leaves. Flowers blue (or white) in axillary few-flowered cymes. Sepals not enlarged in fruit. Corolla small, rotate; limb plicate, entire. Stamens exsert. Ovary 2-celled; ovules 4; styles free from base, each bifid. Capsule globose, 4-valved. Seeds 4. Species 80, chiefly American, 1 cosmopolitan.

(1) *E. alsinoides* Linn. *Sp. Pl. ed. 2*, 392; *Prain, l.c.* 298.

About 6 in. to 1 ft. long; branches wiry, prostrate. Leaves lanceolate (or ovate) silky (or tomentose), .25 to 1 in. long, .2 to .5 in. wide. Flowers 1 to 3; peduncles .1 in. long. Sepals lanceolate, hairy. Corolla .25 in. across, azure blue. Capsule .15 in. through. *Hab.* Sandy sea shores, rather local. Singapore, Changi. Kelantan, Kwala Kelantan (Ridley). *Distrib.* Whole tropics.

7. BONAMIA, Thouars.

Twining shrub. Leaves large, cordate-ovate. Flowers medium-sized in axillary peduncled cymes. Sepals 5, ovate sub-equal. Corolla funnel-shaped outside, limb nearly entire, 5-lobed, plicate. Stamens included, 5. Ovary 2-celled; ovules 4; style bifid to middle; stigmas 2. Capsule ovoid or globose. Seeds 4, glabrous. Species 30, tropical.

(1) *B. semidigyna* Hallier, *Engl. Jahrb.* xvi. 528; *Prain, l.c.* 299. *Breweria cordata* Bl. *Bijdr.* 722.

Large twiner, rusty-tomentose all over. Leaves 4 in. long, 2.5 in. wide; petioles 1.5 in. long. Cymes capitate, 2- to 5-flowered; peduncle 1 to 2 in. long, villous. Sepals .5 in. long. Corolla pale yellow or pure white, 1.5 in. long. Capsule .5 in. long, splitting vertically, hardly covered by the accrescent sepals. *Hab.* Open country. Perak, Ipoh (Curtis). Province Wellesley, Kubang Ulu (Curtis). Penang (Porter and Curtis). Kelantan, Kota Bharu (Ridley). *Distrib.* Mascarenes and South-East Asia.

8. CALYSTEGIA, R. Br.

Prostrate and twining herbs. Leaves often lobed, glabrous. Flowers medium, axillary, solitary (or in cymes). Bracts 2 large leafy enveloping calyx. Sepals ovate or oblong. Corolla campanulate; limb plicate, nearly entire. Stamens included. Ovary 1-celled; ovules 4; style entire, filiform; stigma of 2 oblong lobes. Capsule 1-celled, 4-valved, 4-seeded. Seed black, glabrous. Species about 20, warm and temperate regions.

(1) *C. hederacea* Wall. *Cat.* 1328; *Prain, l.c.* 299.

Prostrate and twining. Leaves cordate or sagittate, 1 to 3 in.

long, .75 to 1 in. wide; petioles 1 in. long. Flowers solitary; peduncle 1 in. long. Bracts ovate, .3 in. across, persistent. Sepals oblong, outer .3 in. long, inner smaller. Corolla pinkish purple, 1 in. long. Capsule ovoid, .3 in. long. *Hab.* Probably a weed; it has only once been collected in our area. Penang (Porter in Herb. Wallich).

9. HEWITTIA, W. and A.

Pubescent twiner. Leaves cordate, angled or lobed. Flowers solitary, axillary. Bracts 2, linear-lanceolate. Sepals 5, acute, outer 3 broad-ovate, inner lanceolate. Corolla medium, pale

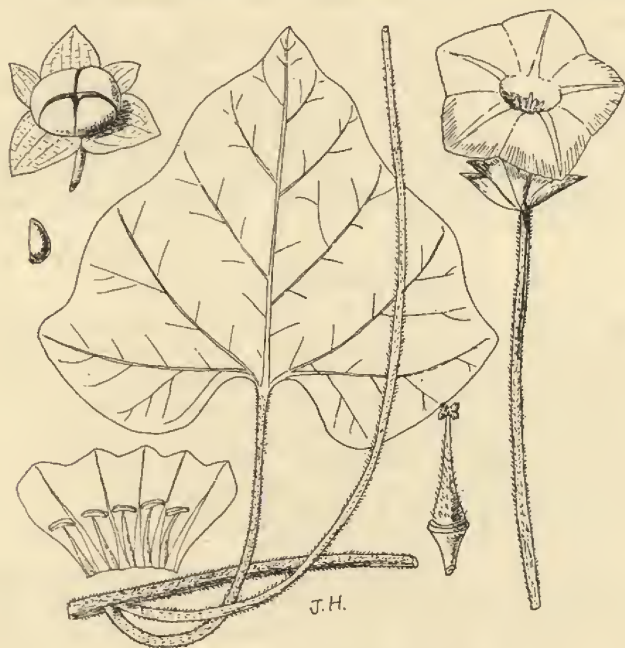


FIG. 117.—*Hewittia bicolor*.

yellow, eye purple, campanulate plicate. Stamens adnate to tube. Ovary 1-celled; ovules 4; style filiform. Stigma of 2 oblong-ovate lobes. Capsule globose, 4-valved, 4-seeded. Seed black, glabrous. Species 1, tropics, Asia and Polynesia.

(1) *H. bicolor* Wight, *Ic. t.* 835; *Prain, l.c.* 300.

Leaves pubescent, 2 to 4 in. long; petioles .5 to 4 in. long. Corolla 1 in. long, hairy outside. Fruit .25 in. long. *Hab.* Not common, in open grassy spots. Malacca Hill, grassy spots by the chapel (Ridley). Perak, Larut (Scortechini).

10. ANISEIA, Choisy.

Twining herb. Leaves elliptic, mucronate or lanceolate. Flowers axillary, solitary (or cymose). Sepals 5, herbaceous, outer 3 larger, ovate, decurrent on peduncle, accrescent in fruit, inner 2 smaller, lanceolate. Corolla funnel-shaped, tube hairy with 5 bands except opposite sepals, limb nearly entire. Stamens included. Ovary 2-celled; ovules 4; style filiform; stigmas 2, globose. Capsule 4-valved, 2-celled. Seed 4, smooth. Species about 5, American, 1 cosmopolitan.

(1) *A. martinicensis* Choisy, *Convol. Rar.* 144; *Prain, l.c.* 301. *Ipomea uniflora* R. and S. in *Hook. fil. F.B.I.* iv. 201.

Slender twiner glabrous or nearly so. Leaves oblong-lanceolate mucronulate, .75 to 3 in. long, .5 to 1 in. wide; petioles .6 in. long. Flowers solitary; peduncle 1 in. long. Sepals, outer .6 in. long, in fruit increased to 1 in. long. Corolla white, tube 1 in. long, limb 1 in. across. Capsule ovoid, .5 in. long. *Hab.* Hedges. Pahang, Pekan. Malacca (Griffith). Perak, Kwala Dipang (Scortechini); Kota Bharu (Kunstler). Kelantan, Kampos (Ridley). *Distrib.* Tropics generally. *Native names:* Akar Ulan Putih; Akar Lidah Patong. *Use:* As a vegetable.

11. JACQUEMONTIA, Choisy.

Twining herbs (or shrubs) pubescent. Leaves cordate or elliptic. Flowers generally light blue in compound capitate or umbellate cymes. Sepals 5. Corolla usually small, funnel-shaped with 5 vertical bands, limb plicate. Stamens 5, included. Ovary 2-celled; ovules 4; style filiform; stigmas 2, linear or oblong. Capsule 8-valved (rarely 4-valved). Seeds 4, glabrous. Species 60 to 70, nearly all Brazilian, 2 or 3 Asiatic.

(1) *J. paniculata* Hallier, *Engl. Bot. Jahrb.* xvi. 541; *Prain, l.c.* 302.

Stems puberulous. Leaves ovate-cordate, pubescent beneath, glabrous above, 1.5 to 3 in. long, 1 to 2 in. wide; petioles .5 to 1 in. long. Heads about .5 in. across, dense; peduncles 1 in. long, puberulous. Sepals ovate-cordate, pubescent, .25 in. long. Corolla .5 in. long, pale blue. Capsule globose, .2 in. through. *Hab.* Scarce, in dry spots. Perak, Kampong Kota (Wray). Perlis, Bukit Lagi, Kanga, on rocks (Ridley). *Distrib.* Africa, Indo-Malaya, Australia.

J. violacea Choisy. A pretty climber with bright blue flowers an inch across, often cultivated in our gardens, comes from Central America.

12. MERREMIA, Dennst.

Climbing shrubs or herbs or prostrate. Flowers axillary, long peduncled, solitary or in few-flowered cymes. Sepals 5, sub-

equal, elliptic or lanceolate acuminate. Corolla campanulate, yellow or whitish yellow, tube with 5 vertical bands, limb plicate, slightly lobed. Stamens 5, unequal; anthers twisted. Ovary 2-(or 4-)celled; ovules 4; stigmas 2, globose. Capsule 4-valved, 1 to 4-locular. Seeds 4. Species about 40, all warm countries. This genus is included in *Ipomœa* in the *Flora of British India*.

Corolla glabrous; leaves not peltate.

Leaves 5-lobed, hairy; flowers large (1) *M. vitifolia*

Leaves entire or slightly lobed; flowers small;
slender twiners.

Sepals acuminate.

Twiner; flowers cream with purple eye (2) *M. hastata*

Prostrate herb in sand (3) *M. tridentata*

Sepals obtuse.

Leaves narrow oblong; flowers primrose
yellow; twiner (4) *M. cæspitosa*

Leaves ovate cordate often crenate; flowers
lemon yellow; slender twiner (5) *M. convolvulacea*

Leaves peltate, very large woody liane (6) *M. nymphæifolia*

Corolla hairy outside.

Leaves hairy; cymes compact; flowers medium (7) *M. umbellata*

Leaves glabrous; cymes lax; flowers large (8) *M. crispata*

(1) *M. vitifolia* Hallier, *Engl. Bot. Jahrb.* xvi. 552; *Prain*, *l.c.* 303.

Climbing on bushes or creeping, hairy. Leaves cordate palmate, 5-lobed, lobes acute, 3 to 6 in. across; petioles hairy, 1 to 4 in. long. Cymes 1- to 7-flowered, hairy; peduncles 1 to 4 in. long. Sepals ovate acute, hairy, .5 in. long. Corolla brilliant yellow, 1.5 in. across. Capsule depressed, globose. *Hab.* Common on river banks, creeping in sand and over bushes, but seldom flowering. Pahang River. Perak, Kwala Kangsa; Larut (Scortechini). Kelantan, Kampong Kota (Gimlette) and all along the Lebir River. Perlis, Chupeng (Ridley). *Distrib.* Indo-Malaya, Siam. *Native name:* Akar Lulang Bulu.

(2) *M. hastata* Hallier, *l.c.* 552; *Prain*, *l.c.* 303. *Ipomœa filicaulis* Bl. *Bijdr.* 721; *I. angustifolia* Clarke in Hook. *fil. F.B.I.* iv. 205.

A slender wiry climber. Leaves hastate-lanceolate, toothed at base, 2 to 3 in. long, .3 to .5 in. wide, acute; petioles very short. Flowers 1 to 3. Sepals narrow, acuminate, .5 in. long. Corolla .6 in. across, creamy yellow with a purple eye. Capsule ovoid, papery. *Hab.* Very common in grassy spots, climbing over bushes. Singapore, Tanglin; Ang Mo Kio; Johor, Below Gunong Pulau. Pahang, Kwala Pahang. Malacca, Pulau Besar (Maingay). Negri Sembilan, Gunong Berumbun (Cantley). Perak, Kwala Wok (Wray); Temengoh on rocks. Penang (Curtis); Ayer Hitam. Kelantan, Kwala Lebir (Gimlette). Setul. *Distrib.* Tropical Africa, Asia and Australia. *Native name:* Akar Kurumak.

(3) **M. tridentata** Hallier, *l.c.* 552; Prain, *l.c.* 304. *Ipomœa tridentata* Roth, *Cat. Bot.* ii. 19; Clarke, *l.c.* iv. 205.

A prostrate herb with a stout root, branches about 2 ft. long or less, slender. Leaves hastate oblong or spatulate linear truncate or 3-toothed. Sepals ovate acuminate, .25 to .35 in. long. Corolla funnel-shaped, .4 to .5 in. across, yellow with a pink eye. Capsule ovoid, papery. *Hab.* In sea sand. Singapore, Changi. Johor, Batu Pahat. Malacca, Tanjong Kling. Penang, Batu Feringhi (Curtis); Telok Bahang. *Distrib.* Africa, India, Banka. *Native name*: Kong Kong Pasir.

(4) **M. cæspitosa** Hallier, *l.c.* 552; Prain, *l.c.* 305. *Ipomœa linifolia* Bl. *Biðr.* 721.

Slender twiner. Leaves narrow oblong cordate, slightly hastate, 1.5 to 2.5 in. long, .5 in. across; petioles .25 to .5 in. long. Flowers cymose; peduncles 1.5 in. long. Sepals elliptic obtuse, .25 in. long. Corolla .75 in. across, primrose yellow. Capsule ovoid, papery, 1-celled, .25 in. long. *Hab.* Common in grass. Like *M. convolvulacea*, this plant is often fasciated. Singapore, Tanglin; Kranji; Chan Chu Kang. Pahang, Pekan. Malacca (Griffith). Perak Larut (Kunstler); Ipoh (Burkill). Province Wellesley, Permatang Bertam. Kemaman. Perlis Kanga. *Distrib.* India, Siam, Malaya, Australia.

(5) **M. convolvulacea** Dennst. *Schlüssel Hort. Malab.* 39; Prain, *l.c.* 305. *M. hederacea* Hallier, *l.c.* 168. *Ipomœa chryseides* Ker. *Bot. Reg. t.* 270.

Slender twiner. Leaves ovate cordate, acute, edges toothed or not, sometimes 3-lobed, 1 in. long, .5 in. wide; petioles .2 in. long or more. Flowers cymose; peduncles .5 to 3 in. long. Sepals elliptic, .2 in. long. Corolla funnel-shaped, .6 in. across, bright canary yellow. Capsule ovoid, .25 in. long. Seeds puberulous. *Hab.* A weed of cultivation and common on sand-banks, often fasciated. Singapore, Gardens; Jurong; Kranji. Johor, Serom, Batu Pahat. Pahang River, Tembeling River. Selangor, Kwala Lumpur. Perak, Durian (Kunstler); Larut; Changkat Mentri (Kloss). Province Wellesley, Prai Dock. Kelantan, Channing. *Distrib.* Africa, Asia, Australia.

(6) **M. nymphæifolia** Hallier, *Verslag. Buitenz.* 1895, 127; Prain, *l.c.* 305. *Ipomœa peltata* Choisy, *Convolv. Or.* 70.

A big liane over 100 ft. tall; stem wrinkled, 2 to 3 in. through, laticiferous. Leaves rather stiff orbicular-ovate, peltate, acute, dark green, 6 to 10 in. long, 5 to 8 in. wide; petioles 1.5 to 3.25 in. long. Flowers in large cymes; peduncle usually long. Sepals broad, coriaceous, .75 in. long. Corolla wide-campanulate, 2 in. across, pure chrome-yellow. Capsule sub-globose, .1 in. through, sepals 1 in. long. Seeds hairy. *Hab.* In forests. Pahang, Pekan. Negri Sembilan, Bukit Danan (Cantley). Malacca, Selador and Chabau (Cantley). Dindings, Pangkor (Scortechini). *Distrib.* Mascarenes, Malaya to Polynesia.

(7) **M. umbellata** Hallier, *Eng. Bot. Jahrb.* xvi. 552. *Ipomœa cymosa* R. and S. *Syst.* iv. 241; *Bot. Reg.* 1843, t. 24.

Long twiner hairy or glabrescent. Leaves oblong cordate acuminate, hairy all over or on nerves beneath only, 1·5 to 4 in. long, 1 to 3 in. wide; petioles ·2 to ·6 in. long. Cymes corymbose; peduncles ·5 to 1 in. long. Sepals elliptic blunt. Corolla tubular campanulate, yellow-buff creamy, 1 to 1·5 in. long. Capsule globose. Seeds black, hairy. *Hab.* Common in thickets in open country, marshy ground. Singapore, Sepoy Lines. Johor, Kota Tinggi. Muar. Pahang, Pekan. Malacca, Chenana putih (Cantley); Kesang Batu (Hervey). Selangor, Klang; Kwala Lumpur (Curtis). Perak, Ipoh (Curtis); Lahat; Thaiping. Dindings, Lumut. Province Wellesley, Tasek Gelugur. Penang (Wallich); Bukit Padi (Curtis). *Distrib.* Tropical Africa and Asia.

var. *occidentalis* Hallier, *Verslag. Buitenz.* 1895, 127. Leaves wide cordate, 4 in. long, 3·5 in. wide. Cymes umbellate. Perak, Sungei Rayah (Kunstler). *Distrib.* South America.

(8) **M. crispatula** Prain, *Beng. Pl.* ii. 730. *Ipomœa petaloidea* Choisy, *Mem. Soc. Gen.* 31, p. 457.

Large climber. Leaves ovate cordate, glabrous or lanceolate above, 5 in. long, 3·5 in. wide; petioles 1·5 in. long. Peduncles 1·5 to 2 in. long. Flowers sub-racemose. Sepals elliptic ovate, large. Corolla wide, funnel-shaped, 1·75 in. across, villous outside, yellow. Capsule ovoid, ·5 in. long. Seeds velvety. *Hab.* Negri Sembilan, Bukit Dusun Tua (Cantley). Very rare. *Distrib.* India.

13. IPOMŒA, Linn.

Herbs (rarely shrubby) twining or prostrate. Leaves alternate, often lobed. Flowers solitary or cymose, axillary. Sepals 5. ovate or linear. Corolla campanulate or funnel-shaped, limb plicate slightly or not lobed. Stamens 5; filaments filiform. Ovary 1- to 3-celled (rarely 4-celled); ovules 4 (or 6); style filiform; stigma capitate, or bilobed. Capsule 4- to 6-valved. Seed 4 (rarely 6), smooth or woolly. Species 300, tropics generally.

Corolla funnel-shaped.

Leaves hairy or pubescent all over, lobed.

Leaves deeply lobed; flowers white (1) **I. pes-tigridis**

Leaves glabrous or nearly so.

Leaves large palmate; flowers large, pink (2) **I. digitata**

Leaves 5-lobed small; flower smaller light pink. (3) **I. pulchella**

Leaves entire or slightly bilobed; flowers large, 4 in. long (4) **I. illustris**

Creepers in sea sand; flowers 1·5 in. long or less.

Leaves oblong, bilobed; flowers dark pink (5) **I. pes-capræ**

Leaves ovate-cordate; flowers pink (6) **I. littoralis**

Leaves oblong to linear; flowers white (7) **I. carnosa**

Creepers and twiner, waste ground.

Leaves ovate cordate; flowers white, purple eye (8) **I. obscura**

Corolla-tube cylindric, dilate above.

Cymes 1- to 6-flowered, slender hairy . . . (9) *I. sagittæfolia*

Cymes 6- to 12-flowered, glabrous . . . (10) *I. staphylina*

(1) *I. pes-tigridis* Linn. *Sp. Pl.* 162; *Prain, l.c.* 311.

Slender, very rough hairy all over. Leaves deep, 5- to 9-lobed, lobes elliptic narrowed at base, 1 to 5 in. long, 1 to 4 in. wide; petioles 1 to 2 in. long. Flowers in a dense head, about .75 in. across on a peduncle 2.5 in. long with a whorl of hairy oblong green bracts surrounding the pure white flowers. Sepals lanceolate, acute. Corolla 1.25 in. long. Capsule ovoid, .25 in. long. *Hab.* In waste ground, not very common. Malacca (Griffith, Maingay). Selangor, Kuala Selangor. Penang, Pulau Tikus in the town (Curtis). *Distrib.* Africa and tropical Asia.

(2) *I. digitata* Linn. *Syst. ed.* 2, p. 228. *I. paniculata* R. Br. *Prodr.* i. 486; *Prain, l.c.* 312.

Root tuberous. Large twiner. Leaves palmate, 5- to 7-lobed, glabrous, lobes lanceolate or spatulate, 3 to 7 in. long, 3 to 6 in. wide; petioles .5 in. long; peduncles 6 in. long. Cymes many-flowered. Sepals elliptic acute, .3 in. long, enlarged in fruit. Corolla 2 in. across, wide campanulate mauve pink. Capsule ovoid, .3 in. long. Seeds woolly with long hairs. *Hab.* Waste ground near villages; wild probably on the sea-shore. Singapore, Changi beach; Chan Chu Kang. Pahang, Pekan (Evans). Perak (Scortechini). Penang (Wallich); Burma Road and Pulau Betong (Curtis). *Distrib.* Cosmopolitan. *Native names:* Kaledek hutan; Kangkong Laut.

(3) *I. pulchella* Roth. *Nov. Sp.* 115; *Prain, l.c.* 312.

Glabrous twiner. Leaves digitate, 5-lobed, lobes ovate acute, base cuneate, central largest, 1.25 in. long, .5 in. wide, laterals smaller; petioles 2 in. long. Cymes 1- to 3-flowered; peduncles 1.25 in. long or less. Sepals ovate, .25 in. long. Corolla campanulate, 2 in. long, 1.5 in. wide, pink. Capsule globose, .5 in. across. Seeds hairy. *Hab.* On slopes and in gardens, railway stations, etc. Cultivated in every town, not wild anywhere. *Distrib.* India, Indo-China.

(4) *I. illustris* Prain, *Beng. Pl.* ii. 735; *Journ. Beng.* lxxiv. 314. *I. campanulata* var. *illustris* Clarke in *Hook. fil. F.B.I.* iv. 211.

Glabrous climber. Leaves ovate-cordate acuminate, 4 to 6 in. long, 3.5 to 5 in. wide; petioles 1.5 in. long. Cymes 2- to 3-flowered on 1 in. long peduncles. Sepals orbicular, blunt, .3 in. long. Corolla campanulate, 4 in. long, 3 in. across, purple. Capsule .5 in. long. Seed hairy. *Hab.* Sea-shores, rare. Penang, Pulau Betong (Curtis). Adang islands, Pulau Tengah (Ridley). *Distrib.* Ceylon, India, Indo-China, Malaya.

(5) *I. pes-capræ* Roth, *Nov. Sp.* 109; *Prain, l.c.* 315. *I. biloba* Forsk. *Fl. Aegypt.-Arab.* 44.

Far-creeping plant in sand. Leaves orbicular emarginate,

bilobed, 1 to 4 in. long and about as wide; petioles 1 to 4 in. long. Cymes 1- to 3-flowered; peduncles 1 to 4 in. long. Sepals ovate blunt. Corolla tubular-campanulate, 2 in. long and as wide, mauve pink. Capsule .5 in. long. Seed hairy. *Hab.* Common on all sandy sea-shores. Singapore, Jurong; Bajau; Changi. Pahang, Sungei Meang. Malacca, Chenana Putih (Cantley); Pulau Sebang (Goodenough). Penang (Deschamps). Perlis. Kelantan by the side of the railway inland from Kota Bharu. *Distrib.* All tropics sand-hills. *Native name*: Tapah Kudah.

I found a patch of this sea-shore plant on a cart track in the Bukit Tangga Pass in Negri Sembilan; perhaps the seed had been brought up in a cart of sea sand. It was flowering and fruiting here, many miles from the sea.

(6) **I. littoralis** Bl. *Bijdr.* 713. *I. denticulata* Choisy D.C. *Prodr.* ix. 379; *Prairie*, l.c. 314.

Trailing sea-shore plant. Leaves ovate-cordate, acute, entire or toothed, 1 to 2.5 in. long, .75 to 1 in. wide; petioles .25 in. long. Peduncles 1 in. long; flowers 1 to 3. Sepals elliptic acute. Corolla 1.5 in. long, funnel-shaped, pink. Capsule globose, .3 in. long. Seeds glabrous. *Hab.* Sea sands, trailing, often a long way; not common. Singapore, Changi. Johor, Tana Merah Road. Pahang, Rumpin River; Kwala Pahang. Dindings, Pangkor (Curtis). Penang, Bagian Jennal (Curtis). *Distrib.* Shores of the Indian and Pacific oceans, Seychelles to Polynesia.

(7) **I. carnosa** R.Br. *Prodr.* 485. *I. acetosæfolia* R. and S. *Syst.* iv. 246. *I. littoralis* Boiss. *Fl. Or.* iv. 112, not of Blume; *Prairie*, l.c. 316.

Sea-shore creeper. Leaves oblong emarginate or lobed, or linear-oblong, 1.25 in. long, .25 to .75 in. wide; petioles 1 in. long. Cymes 1- to 3-flowered; peduncles 1 in. long. Sepals ovate-blunt, .6 in. long. Corolla 2 in. long and as wide, campanulate white. Capsule ovoid, .4 in. long. Seed villous. *Hab.* Sea sands; not common. Pahang, Rumpin River. Malacca, Tanjong Kling (Ridley, Griffith). *Distrib.* All tropic shores.

(8) **I. obscura** Ker, *Bot. Reg. t.* 239; *Clarke*, l.c. iv. 207.

Twinner and creeper, hairy or glabrous. Leaves ovate-cordate acute, 1 to 2.5 in. long and wide; petioles 1 to 2 in. long. Peduncles 1 to 3 in. long; flowers 1 to 3. Sepals .20 in. long. Corolla 1 in. across and long, yellowish white with purple spot at base. Capsule .25 in. long, ovoid. Seed brown-velvety. *Hab.* Waste ground. Singapore, Paya Goyang; Galang Saw-mills (Ridley). *Distrib.* Africa to Malay isles.

(9) **I. sagittæfolia** Burm. *Fl. Ind.* 50; *Prairie*, l.c. 317. *I. sepiaria* Roxb. *Hort. Beng.* 14.

Slender hairy twinner. Leaves ovate cordate, glabrous or pubescent, acuminate sometimes tri-lobed, 1 to 2.5 in. long, .75 to 2 in. wide; petioles 1 to 2 in. long. Cymes 1- to 6-flowered;

peduncles 3 in. long. Sepals ovate blunt, .2 in. long. Corolla-tube cylindric, limb abruptly expanded, 2 in. long, pink. Capsule .25 in. long, 2 to 4 furry seeds. *Hab.* Waste ground. Singapore, Rochor saw mills. Malacca, Merlimau Road (Derry). Kedah, Alor Sta and near Gunong Geriang (Ridley). *Distrib.* Tropical Asia.

(10) **I. staphylina** *R. and S. Syst.* iv. 249, *var.* *Malayana Prain, Journ. As. Soc. Beng.* lxiii. 2, p. 106; lxxiv. 317.

Long, climbing, shrubby. Leaves glabrous, ovate blunt, base round; nerves conspicuous, 3 to 4 in. long, 1.5 to 2 in. wide; petioles 2 in. long or less. Cymes lax, 6- to 12-flowered; peduncles 1 in. long. Sepals ovate, .2 in. long. Corolla tubular, funnel-shaped, 1 to 1.25 in. long, .3 in. wide at top, pale pink. Capsule ovoid, .3 in. long. Seeds long silky. *Hab.* Pahang, Kwala Tahan (Seimund). Perak Larut (Kunstler). Penang, Ayer hitam (Curtis, Porter). Kedah, Alor Sta. *Distrib.* Sumatra.

CULTIVATED SPECIES

- I. **LEARII** *Paxt. Bot. Mag.* vi, 267, and *I. hederacea* *Jacq.* are cultivated morning-glories often planted or run wild in hedges and waste ground.
- I. **HORSFALLIÆ** *Hook.*, of the West Indies, with its deep green-lobed leaves and crimson flowers, is also a garden favourite.
- I. **BATATAS** *Lam. Encycl. Meth.* iv. 14; *Prain, l.c.* 313. Sweet potato; Keledok of the Malays. Trailer. Leaves ovate, angular or lobed. Flowers white or pale pink. Extensively cultivated, native of America.
- I. **REPTANS** *Poir. Encyc. Meth. Suppl.* iii. 460. *I. aquatica* *Forsk. Flor. Aeg. Arab.* 44; *Prain, l.c.* 316. Aquatic fleshy plant with elliptic cordate-hastate leaves and white flowers, extensively cultivated as a vegetable under the name of Kangkong.

14. **LEPISTEMON**, Bl.

Climbing hairy twiners. Leaves cordate, often lobed. Flowers small in dense cyme heads, axillary. Sepals 5, sub-equal, herbaceous. Corolla small, pale yellow, tube hairy, dilate at base, cylindric above lobes, recurved. Stamens dilated into concave scales, hairy curving over ovary at base; filaments thin, erect, glabrous. Disc large, cupular. Ovary 2-celled; style very short; stigma bipartite. Capsule 4-valved. Seed glabrous. Species 3, Africa and Indo-Malaya.

(1) **L. flavescens** *Bl. Bijdr.* 722; *Prain, l.c.* 309.

Villous hairy all over. Leaves ovate-cordate, sometimes 3-lobed, 3 to 5 in. long and wide; petioles 1 to 2 in. long. Cymes 5- to 30-flowered, sessile or short-peduncled, 2 in. long or less. Sepals .25 in. long, lanceolate acute. Corolla .5 in. long, .2 in.

across, yellowish white. Capsule .25 in. long. *Hab.* Thickets on borders of forests. Selangor, Batu Caves; Sungei Buluh. Negri Sembilan, Tampin Hill. Perak, Tapah; Goping (Kunstler). Province Wellesley, Ara Kudah. *Distrib.* Assam to Philippines.

EXCLUDED SPECIES AND PLANTS CULTIVATED ONLY

PORANA VOLUBILIS *Burm.* The bridal wreath. A big woody climber with large panicles of small white flowers, commonly cultivated in gardens, a native of the Eastern Archipelago. Griffith has specimens from hedges in Malacca, but it is certainly not wild here.

OPERCULINA TURPETHUM *Manso*, given as from Malacca, Griffith, by Prain, *l.c.* 308. Griffith's plant in Herb Kew was collected in Mergui, and no one else has found it in the Peninsula. *O. TUBEROSA* *Meissn*, *Prain*, *l.c.* 308 was formerly cultivated in the Botanic Gardens, Singapore, and spread as far as across the road opposite, but has, I believe, now quite disappeared.

CALONYCTION BONA-NOX *Boj. Hort. Maur.* 227. The moon flower is often cultivated in gardens, but does not establish itself outside.

QUAMOCLIT PINNATA *Boj. Hort. Maur.* 224, with crimson red or white flowers and finely cut fennel-like leaves, and *Q. PHENICEA* *Choisy, Conv. Or.* 51, *t.* 1, *f.* 1, with ovate-cordate entire or lobed leaves and scarlet flowers are cultivated in gardens, but have not established themselves outside.

ORDER XCVIII. CARDIOPTERIDÆ.

Twiners or trees. Leaves alternate. Flowers in panicles, small, bisexual. Calyx tubular, 5-lobed, lobes imbricate. Corolla campanulate or tubular, 5-lobed. Stamens 5, attached to tube. Ovary 1- to 2-celled; ovules 2; styles 2. Fruit winged. Seed 1, linear, albuminous. Genera 2 and species 5, Malayan. These plants, formerly placed in *Olacinæ*, are transferred to a more natural affinity here.

Climbing herb; flowers in axillary scorpioid cymes

panicled 1. CARDIOPTERIS

Trees; flowers in terminal panicles 2. PTELEOCARPA

1. CARDIOPTERIS, Wall.

A slender glabrous laticiferous herb, climbing. Leaves alternate, membranous, ovate-cordate, palminerved. Flowers very small, white in axillary lax scorpioid panicles. Calyx 5-partite, imbricate. Corolla campanulate, deeply 5-lobed. Stamens 5, short, attached to the tube. Pistil cylindric, 1-celled. Ovules 2. Stigmas 2, 1 short, the other lengthening after flowering. Fruit a thin obovate retuse samara. Species 1, Indo-Malaya.

(1) **C. lobata** Wall. *Cat.* 8033A; *Benn. Pl. Jav. Rar.* 246, *t.* 49; *King, Journ. As. Soc. Beng.* lxiv. 132.

Leaves acuminate more or less lobed; nerves 7 to 9 radiating from the base; 2.25 to 5 in. long, 1.5 to 2.75 in. wide; petioles 2 to 5 in. long. Panicles 2 to 4 in. long; branches few. Flowers .1 in. long, distant pedicelled. Fruit .8 to 1.25 in. long, .6 to .8 in. wide. *Hab.* Forest edges twining over bushes, not common. Pahang, Pulau Tawar (Ridley). Perak, Tapah (Wray); Temengoh. *Distrib.* India, Siam, Malay isles to New Guinea. *Native name*: Gambah Putih.

2. PTELEOCARPA, Oliv.

Glabrous tree. Leaves alternate. Panicles terminal. Flowers small. Calyx tubular, deeply 5-lobed, imbricate. Corolla tubular, 5-partite. Stamens 5, attached to tube; anthers linear-oblong. Ovary stipitate 2-celled; ovules 1 in. each cell; styles 2; stigmas small. Fruit samaroid, orbicular emarginate, 2-celled. Seed elongate. Species 3, Malay Peninsula, Sumatra, Borneo.

(1) **P. malaccensis** Oliv. *Trans. Linn. Soc.* xxviii. 515, *t.* 42; *King, l.c.* 131.

Tree about 60 ft. tall. Leaves stiffly membranous oblanceolate acuminate, base much narrowed; nerves 5 or 6 pairs; 3 to 4.5 in. long, 1.25 to 1.5 in. wide; petioles .6 to .75 in. long. Panicles terminal, many-flowered, umbellate-cymose, 1.5 to 2.5 in. long. Flowers yellow, .3 in. across on filiform pedicels .15 to .25 in. long. Fruit 1.25 to 1.65 in. long, 1.1 in. across, yellow. *Hab.* Woods in the lowlands. Singapore, Changi. Johor, Tebrau River Malacca (Maingay); Bukit Sadanen (Goodenough); Ayer Panas. Perak (Wray). Penang, Sungei Penang Road and the Hill to 1000 ft. altitude (Curtis). *Distrib.* Sumatra. *Native name*: Singah.

ORDER XCIX. SOLANACEÆ.

Herbs or shrubs. Leaves alternate or in unequal pairs often lobed. Cymes terminal or axillary. Flowers regular bi-sexual, several or solitary. Calyx inferior, gamopetalous, teeth 5 (rarely 4, 6 or 10), usually persistent. Corolla gamopetalous, 5-lobed (or *Datura* 10-lobed) or nearly entire; campanulate to rotate. Stamens 5, on tube anthers dehiscent by pores or longitudinally. Ovary 2-celled (or 1-celled by abortion) or 4-celled; ovules numerous on intruded placentas; style linear; stigma capitate or bilobed. Fruit a berry or 2- rarely 4-celled capsule. Seeds many; disc-like or reniform. Species 1300, whole world. (Prain, *Journ. As. Soc. Beng.* lxxiv. 327.) Fruit a berry.

- Anthers dehiscing by pores at tip 1. SOLANUM
 Anthers dehiscing longitudinally.
 Fruit usually long, very pungent; calyx small 2. CAPSICUM
 Fruit globose not pungent; calyx enlarged in fruit 3. PHYSALIS
 Fruit capsular, 4-celled, 4-valved, thorny 4. DATURA

1. SOLANUM, Linn.

Armed or unarmed herbs or shrubs. Leaves alternate or sub-opposed, entire or lobed. Calyx 5- or 10-lobed, sometimes enlarging in fruit. Corolla rotate, short-tubed, blue or white, 5-lobed. Stamens adnate to corolla-tube; anthers narrowed upwards with terminal pores. Style columnar; stigma small. Fruit a yellow, red or black berry. Seed disc-like, numerous. Species 750, mostly American, but many in the Old World.

Unarmed herbs or shrubs.

Flowers cymose peduncled.

- Herb nearly glabrous; leaves thin; berry small, black (1) *S. nigrum*
 Large shrubby plant densely woolly; berry yellow (2) *S. verbascifolium*

Flowers fascicled axillary or solitary.

- Epiphytic; calyx sub-entire; flowers white (3) *S. parasiticum*
 Terrestrial, calyx 10-toothed.
 Teeth 5 long, 5 short; flowers blue (4) *S. Blumei*
 Teeth 10, long; flowers white.
 Leaves and stem sparsely hairy (5) *S. decemdentatum*
 Leaves and stem densely soft hairy (6) *S. biflorum*

Armed shrubs or herbs.

Under 4 ft. tall.

- Tomentose or pubescent; leaves large thorny on nerves.
 Fruit spiny haired; calyx-lobes not covering fruit; flowers white (7) *S. ferox*
 Fruit spiny haired; calyx overlapping fruit (8) *S. involucratum*
 Fruit smooth, large, pear-shaped with side lobes; flowers blue (9) *S. mammosum*
 Fruit smooth, globose, large (10) *S. coagulans*
 Sub-glabrous covered all over with long spines; fruit globose, scarlet; flowers white (11) *S. aculeatissimum*

Tall shrubs, 4 to 8 ft. tall.

- Flowers in corymbose cymes, white (12) *S. torvum*
 Flowers racemose, blue (13) *S. indicum*

Slender procumbent or scrambling herbs, very thorny.

- Flowers 1 in. across, blue, 5 to 8 in a cyme (14) *S. trilobatum*
 Flowers 7 in. across, blue, 1 to 2 on a peduncle (15) *S. sarmentosum*

(1) *S. nigrum* Linn. *Sp. Pl.* 186; *Prair.* l.c. 329.

Herb 1 to 3 ft. tall, glabrous (sparingly pubescent). Leaves membranous oblong acuminate or ovate, narrowed both ends, entire or more or less lobed, 1.5 to 3 in. long, .2 in. across; petioles .2 to .5 in. long. Flowers white, small in 4- to 6-flowered umbels;

peduncles .25 in. long; pedicels .1 in. long. Calyx very small. Corolla .2 in. wide. Berry .15 in. through, black, pea-shaped. *Hab.* Waste ground in open country. Common. Singapore, Gelang. Johor, Batu Pahat; Bukit Murdom (Feilding). Malacca, Tanjong Kling; Ayer Panas (Hervey). Perak, Kota Bharu (Kunstler). Kedah, Yan. Perlis, Chupeng. *Distrib.* Tropics generally and in various varieties in temperate regions. *Native name*: Trong Parachichit. *Use*: As a potherb. The typical *S. nigrum* is the European form with slightly larger flowers, leaves and berries, a very different-looking plant.

(2) ***S. verbascifolium*** Linn. *Sp. Pl.* 184; *Prain, l.c.* 329.

Shrub 6 to 8 ft. tall, thick stellate tomentose. Leaves thick, herbaceous, ovate-lanceolate or lanceolate acute, base blunt, green above, yellowish white tomentose beneath, 4 to 7 in. long, 3 in. across; petioles .5 to 1 in. long. Corymb cymose, sub-terminal tomentose; peduncle 1 to 3 in. long. Calyx-teeth 5, small, acute tomentose. Corolla .6 in. across, tomentose outside, white. Fruit globose, yellow, .4 in. through. *Hab.* Open ground, thickets. Pahang, Pulau Tawar. Selangor, Kwala Lumpur (Goodenough). Perak, Larut (Kunstler). Penang (Deschamps). Kedah (Kunstler). Kelantan, Chaning. *Distrib.* Tropics generally. *Native name*: Sakasap.

(3) ***S. parasiticum*** Bl. *Bijdr.* 697; *Prain, l.c.* 330.

Glabrous epiphytic shrub 2 to 4 ft. tall. Leaves firmly membranous, lanceolate acuminate, narrowed at both ends, 6 to 8 in. long, 1.5 to 2 in. wide; petioles .25 in. long. Flowers 2 to 7 in a fascicle, axillary; pedicels .6 to .8 in. long. Calyx saucer-shaped, sinuate on edge. Corolla white, rotate, .25 in. across. Fruit yellow, globose, .25 in. across. *Hab.* Forests, scarce. Perak, Ulu Bubong and Goping (Kunstler). *Distrib.* Java, Sumatra.

(4) ***S. Blumei*** Nees in Bl. *Bijdr.* 696; *Prain, l.c.* 330.

Glabrous terrestrial shrub, 3 to 4 ft. tall. Leaves paired unequal, membranous, elliptic long-acuminate, base cuneate, unequal, 4 to 6 in. long, 2 to 3 in. wide; petioles .3 in. long. Flowers in fascicles of 3 to 6; pedicels .2 in. long, deflexed. Calyx subtruncate with 5 long and 5 short subulate teeth alternate. Corolla .3 in. wide, violet. Fruit globose, red. *Hab.* Mountain woods from 1500 ft. altitude upwards. Pahang, Telom. Johor, Gunong Pantai (Kunstler). Selangor, Batu Caves; Semangkok Pass; Ginting Bidai. Perak, Thaiping Hills (all collectors) up to 5500 ft. altitude; Batang Padang (Wray); Tambun near Ipoh. *Distrib.* Sumatra, Java, Borneo.

(5) ***S. decemdentatum*** Roxb. *Fl. Ind.* (1), 565. *S. biflorum* Prain, *l.c.* 331, not of Loureiro.

Sparsely hairy shrub 6 ft. tall or less, unarmed. Leaves thinly membranous, sparsely hairy above, edges hairy, elliptic acuminate, base decurrent on petiole, 3 to 5 in. long, 1.75 in. wide; petioles

1 in. long. Flowers in axillary fascicles of 2 to 6; pedicels 1 to 25 in. long, rough hairy. Calyx cup-shaped with linear teeth, 12 in. long, sparsely hairy, shorter than corolla. Fruit globose much longer than sepals. *Hab.* Open country. Rare and dubious as native except in the north. Singapore (Wallich). Malacca (Griffith), locality doubtful, as the same number in his collection is given for Mergui. Jalor, Biserat (Annandale).

(6) **S. biflorum** Lour. *Fl. Cochinchine*, 129. *S. mollissimum* Bl. *Bijdr.* 698.

Slender twiggy unarmed shrub softly hairy all over. Leaves thin, membranous elliptic-lanceolate acuminate long, decurrent on the petiole; nerves 4 pairs very faint; 2.25 in. long, 1 in. wide; petioles .5 in. long. Flowers solitary, axillary; pedicel .25 in. long, all softly hairy except corolla. Calyx cup-shaped with 5 linear teeth as long as the corolla, .15 in. long. Corolla-lobes lanceolate. Fruit globose shorter than calyx, glabrous. *Hab.* Pahang, Gunong Senyum (Evans). *Distrib.* Java, Cochinchina and China.

(7) **S. ferox** Linn. *Sp. Pl. ed. ii.* 267; *Prain, l.c.* 331.

A prickly tomentose plant about 2 ft. tall. Leaves sub-opposite, membranous, ovate with short triangular lobes tomentose all over, paler on backs; nerves thorny; 5 to 9 in. long, 3 to 6 in. wide; petioles 1 to 2.5 in. long. Flowers in short-peduncled racemes few below leaves. Calyx funnel-shaped, dense hairy, lobes ovate acute. Corolla white tomentose outside nearly 1 in. across. Fruit globose, 1 in. through, yellow hairy with bristly hairs. *Hab.* Waste ground, said by Malays to have been brought from Java. Pahang River, Negri Sembilan, Bukit Tangga Pass. Perak, Gunong Mesak and Sungei Rayah (Kunstler). Penang (Wallich, Curtis). Tringganu, Bundi (Rostados). *Distrib.* India, China, Sumatra, Java.

(8) **S. involucratum** Bl. *Bijdr.* 701.

Much resembling *S. ferox*, but less tomentose. Leaves ovate, sinuate-lobed thinly pubescent, 4 to 6 in. long, 4 in. wide, thorny on nerves both sides; petioles thorny, 1 to 2 in. long. Flowers 1 to 3 together, axillary. Calyx-lobes large, ovate-lanceolate, thorny, velvety, 1 in. long. Corolla blue? Fruit globose bristly, enclosed in the large calyx-lobes. *Hab.* Open places in the northern parts. Perak, Temengoh; Grit (Ridley). Perlis, Kanga (Ridley). *Distrib.* Java.

(9) **S. mammosum** Linn. *Sp. Pl.* 187.

A branching shrub about 3 ft. tall and as wide or more, more or less pubescent and spiny. Leaves ovate, acutely lobed, pubescent or velvety, spiny on nerves, 3 to 5 in. long and about as wide; petioles 1.5 in. long, thorny. Flowers 2 or 3 in a raceme, densely hairy, about 1 in. long. Calyx-lobes lanceolate acute, hairy. Corolla blue about .5 in. across. Fruit obpyriform blunt, 3 in.

long and 1.75 in. through at base with several short, blunt mamilla-like lobes from the base, orange, pericarp thick pithy. *Hab.* Very common by roadsides throughout Selangor and Malacca, also Pahang River at Pekan, and Kelantan, Kwala Lebir (Gimlette). Very conspicuous in fruit. *Distrib.* South America, an alien in Siam also.

(10) ***S. coagulans*** Forsk. *Fl. Aeg. Arab*, 47; *Clarke in Hook. fil. F.B.I.* iv. 236.

Shrub, thorny densely stellate tomentose. Leaves large, ovate, lobed velvety, thorny on the nerves both sides, 6 in. long, 5 in. wide; petioles thick, thorny, 3 in. long. Calyx densely tomentose, lobes ovate, sub-acute. Corolla .5 in. wide, blue, the plications on the back tomentose. Fruit globose, smooth, 1.5 in. through, orange colour. *Hab.* Waste ground. Singapore, Gelang; Serangoon. Kelantan, Kwala Lebir (Gimlette). *Distrib.* Old World tropics. *Native name*: Trong Prat.

(11) ***S. aculeatissimum*** Jacq. *Coll. i.* 100; *Prain, l.c.* 335.

A shrubby very prickly plant about 1 ft. tall, branched, glabrous. Leaves ovate lobed, lobes acute or blunt, nearly glabrous, membranous with long yellow spines on the nerves, about 1.5 to 4 in. long, 1.5 to 3 in. across; petioles thorny, 1.5 to 2 in. long. Flowers solitary or few. Calyx-lobes under .25 in. long, prickly. Corolla .25 in. across, white. Fruit smooth, globular, .75 in. through, brilliant red. Seeds .2 in. long. *Hab.* Sea-shores. Common in sandy spots. Singapore, Gelang. Pahang, Pulau Tawar. Perak, Temengoh. Tringganu, Bundi (Rostados). Kelantan, Kamposa; Kwala Lebir (Gimlette); Perlis, Kanga. *Distrib.* South Siam, Java. Sumatra. *Native names*: Trong Puyuh; Trong Kapah; Trong Purat; Trong Blanda.

(12) ***S. torvum*** Sw. *Prodr. Veg. Ind. Occ.* 47; *Prain, l.c.* 332. (Fig. 118, p. 469.)

Shrub about 5 ft. or more tall, spreading, shortly stellate pubescent and prickly. Leaves sub-opposite, ovate lobed, acute, base truncate unequal, pubescent all over, 2 to 4 in. long, 1.5 to 3 in. across; petioles .5 to 1 in. long. Flowers in erect corymbose cymes about 2 in. long, pubescent. Calyx .25 in. long, pubescent. Corolla white, .5 in. across, lobes acuminate. Fruit yellow, .3 in. through. *Hab.* Common in waste ground, villages and roadsides. Singapore, a garden weed, Holland Road. Johor, Tanjong Kupang. Pahang, Pekan; near Raub (Machado). Malacca, Brisu (Derry). Perak, Temengoh. Penang Hill (Curtis). Tomoh (Machado). Tringganu, Bundi (Rostados). Kelantan, Kwala Lebir (Gimlette). Setul. *Distrib.* East Asia and America. *Native names*: Trong Rajah Wang; Trong pipit; Trong Rumbang; Trong Mangon or Mangas. *Use*: Fruit eaten in curry.

(13) ***S. indicum*** Linn. *Sp. Pl.* 187 (part); *Prain, l.c.* 283.

Erect shrub 4 to 8 ft. tall, tomentose, prickly. Leaves membranous, ovate sinuate lobed, base oblique truncate, green tomentose

above, grey tomentose beneath, 1.5 to 3 in. long, 1 to 2 in. wide; petioles 1 in. long. Flowers in lateral racemes, 3 in. long or less, tomentose and prickly. Calyx .25 in. long; teeth lanceolate acute. Corolla purple, .5 in. across. Fruit orange, .25 in. through. *Hab.* Waste ground. Not common, Pulau Aor (Feilding). Malacca (Griffith). Selangor (Kunstler). Kelantan, Kwala Lebir (Gimlette). *Distrib.* South-East Asia.

(14) **S. trilobatum** Linn. *Burm. Fl. Ind.* 57, t. 22.

A nearly glabrous sarmentose thorny plant. Leaves ovate or elliptic, irregularly sinuate-lobed, base broad often emarginate,



FIG. 118.—*Solanum torvum*.

3 in. long, 1.5 in. wide; petioles .5 in. long, thorny. Cymes lateral, 5- to 8-flowered; peduncles .5 in. long; pedicels umbelled, .5 in. long. Calyx-lobes .2 in. long, hardly enlarged in fruit. Corolla 1 to 1.5 in. across, blue. Fruit .25 in. through. *Hab.* Native gardens and waste ground. Malacca (Griffith, Cuming). Penang (Curtis). *Distrib.* India, China, Siam. *Use*: Root used in medicine.

(15) **S. sarmentosum** Nees, *Trans. Linn. Soc.* xvii. 58; *Prain, l.c.* 334. *S. Maingayi* Kurz, *Rev. Gen.* 453.

Straggling, prickly shrub, procumbent, sparsely hairy; branches and nerves of leaves prickly. Leaves membranous,

elliptic lobed, nearly glabrous above, sparsely hairy beneath, 2 to 4 in. long, .75 to 2 in. wide. Flowers 1 or 2 on a peduncle about 1 in. long. Calyx-tube funnel-shaped, lobes prickly much enlarged in fruit. Corolla .7 in. across, blue. Fruit glabrous, orange, .5 in. through; sepals caudate acuminate thorny, .75 in. long and .35 in. wide. *Hab.* Chinese gardens and an escape in villages. Singapore, Garden weed. Malacca (Griffith). Pahang, Pekan; Pulau Tioman, Joara Bay (Burkill). *Distrib.* Malay islands. *Native name*: Trong Tikus.

Kurz's *S. Maingayi* is based upon a bad specimen of what appears to be *S. sarmentosum*.

2. CAPSICUM, Linn.

Herbs, slightly shrubby at base. Leaves alternate. Flowers axillary solitary or several together. Calyx campanulate, minutely 5-toothed, not enlarging in fruit. Corolla short, rotate, 5-lobed, yellowish white. Stamens dehiscing longwise. Ovary 2-celled. Fruit elongate red or yellow, pungent (rarely globose, black or red). Seeds discoid. Species doubtful, 2 or several, American.

(1) *C. minimum* Roxb. *Fl. Ind.* i. 574.

Shrubby, about 2 ft. tall, spreading. Leaves thin lanceolate. Flowers 2 to 3, together. Calyx cup-shaped, teeth 5, very small. Corolla .25 in. across, white; anthers purplish blue. Fruit ovoid, oblong cylindric orange scarlet, .5 to .75 in. long, erect. *Hab.* Limestone rocks, thoroughly established at Selangor, Batu Caves, cultivated everywhere. *Native names*: Chabai; Lada Merah, Bird's-eye pepper or bird-pepper. Practically only two forms of capsicum are cultivated here. *C. annuum*, with fruit cylindric acuminate, .4 to 5 in. long, .25 in. through, chiefly cultivated by the Chinese. It is the source of cayenne pepper. The other garden forms described by Prain, *l.c.* 337, are very occasionally cultivated in European gardens. Capsicums were cultivated in the East Indies as early as 1540.

3. PHYSALIS, Linn.

Herbs. Leaves alternate entire or shortly lobed. Pedicels solitary axillary. Calyx campanulate, 5-lobed, in fruit enlarged and inflated. Corolla campanulate, yellow. Stamens attached to base, anthers dehiscing longitudinally. Fruit a berry. Species 35, chiefly American.

(1) *P. minima* Linn. *Sp. Pl.* 183; Prain, *l.c.* 338.

A weed about 6 to 15 in. tall, spreading. Leaves ovate sinuate, 2 in. long, .75 in. wide. Calyx in flower, lobes lanceolate .2 in. long, in fruit green bladder-like, .75 to 1 in. long, 6- to 10-ribbed. Corolla light yellow with purple at base. Fruit yellow globose, .5 in. through, enclosed in the enlarged calyx. *Hab.* Waste ground and sea-shores.

var. *typica*. Calyx not angled; whole plant pubescent, Perak (Scortechini).

var. *indica* Clarke in Hook. fil. F.B.I. iv. 238. Calyx 5-angled, glabrous. Common, Singapore, Serangoon Road; Pulau Ubin shore; Holland Road. Johor, Batu Pahat; Pulau Dayong (Feilding). Pahang, Pekan. Malacca (Griffith). Mt. Ophir. Negri Sembilan, Tampin. Selangor, Kwala Lumpur (Curtis); Batu Caves; Rantau Panjang. Perak, Kota Bharu (Kunstler); Ipoh (Curtis). Jalor, Biserat (Gwynne-Vaughan). *Distrib.* Tropical Asia. *Native name*: Chipluan.

4. DATURA, Linn.

Herbs (or shrubs) minutely pubescent viscid. Leaves sinuate, toothed or entire. Flowers solitary, very large, purple or white. Calyx long, tubular, 5-toothed. Corolla tubular, funnel-shaped, limb plaited. Stamens from near base of tube; filaments filiform; anthers dehiscing longitudinally; style filiform; stigma bilobed. Capsule ellipsoid, 4-valved spiny. Seeds numerous. Species 10, whole world.

(1) *D. fastuosa* Linn. Syst. ed. 2, p. 256; Prain, l.c. 339.

Herb 3 to 6 ft. tall, sub-glabrous. Leaves ovate toothed deeply, 6 to 8 in. long, 3 to 4 in. across. Petioles 1 in. long. Flower-pedicels .2 to .5 in. long. Calyx 3 in. long; lobes lanceolate. Corolla 7 in. long, limb 3 in. across, shortly 5- to 6-toothed. Capsule oblong, 3 in. long, 1.5 in. through.

var. (a) *typica*. Whole plant purplish. Flower purple. The commonest form and the most poisonous.

var. (b) *alba*. Plant green; flower white. *Hab.* In gardens and waste ground, not native. *Distrib.* Africa, Asia. *Native name*: Kechubong. *Use*: Application of leaves to sprains or bruises as an anodyne. A very dangerous drug commonly used in criminal poisoning (Gimlette, "Malay Poisons," ed. i. p. 77).

ORDER C. SCROPHULARIACEÆ.

Herb (very rarely epiphytic shrubs, *Wightia*). Leaves usually opposite. Flowers irregular (rarely sub-regular) bi-sexual. Calyx inferior, 5-lobed, rarely 4-lobed. Corolla 2-lipped, upper lip entire or bilobed, lower 3-lobed. Stamens 4 (very rarely 5) didynamous, or 2 sterile staminodes; anthers 2-rarely one-celled often connivent. Disc annular or glandular. Ovary superior, 2-celled; ovules numerous; style simple; stigma capitate simple or bilobed. Fruit a capsule (rarely a berry). Seeds small numerous. Species 2000, all regions. (Prain, *Journ. As. Soc. Beng.* lxxiv. (2) 341.)

Epiphytic shrub; flowers large pubescent 1. WIGHTIA
Herbs; flowers small, distinctly 2-lipped.
Stamens 4 fertile.

- Throat of corolla with a plicate palate not spurred; calyx-lobes broad, spreading in fruit 2. MAZUS
- Throat of corolla with a plicate palate; corolla spurred 3. LINARIA
- Throat not plicate.
- Upper lobe of calyx larger than the others; 2 or all anthers 1-celled 4. ADENOSMA
- Lateral lobes of calyx much narrower than the other 3; anthers 2-celled; corolla sub-equally 5-lobed 5. HERPESTIS
- Lobes of calyx equal or nearly so; anthers 2-celled; lobes sub-equal 6. LIMNOPHILA
- Stamens with appendages at base; dwarf herbs; flowers small 7. VANDELLIA
- Stamens with no appendages; calyx broad-winged; flowers showy; low herbs 8. TORENIA
- Stamens with no appendages; calyx-lobes broad, not winged; tall herb 9. ARTANEMA
- Stamens 2 fertile only, 2 staminodes.
- Calyx 4-lobed, 2 outer lobes broad 10. CURANGA
- Calyx 5-lobed; lobes narrow 11. BONNAYA
- Calyx 5-toothed; corolla with 4 short and 1 long lobe 12. MICROCARPÆA
- Stamens 4 didynamous.
- Corolla tubular 2-lipped; anthers 1-celled 13. STRIGA
- Corolla 5-lobed; lobes sub-equal; anthers 2-celled.
- Corolla-tube long, glabrous; calyx spathaceous 14. CENTRANTHERA
- Stamens 4 sub-equal.
- Corolla-tube very short, mouth hairy 15. SCOPARIA

1. WIGHTIA, Wall.

Large liane or tree. Leaves opposite coriaceous entire. Flowers large purple in axillary racemes appearing when the plant is leafless, pubescent. Calyx campanulate, 3- to 5-lobed. Corolla incurved, upper lip bilobed, lower 3-lobed. Stamens 4, didynamous exsert; anthers sagittate. Style long, tip incurved. Capsule oblong-lanceolate acuminate dehiscing on one side. Seeds linear-oblong winged at both ends. Species 3, Indo-Malaya.

(1) *W. borneensis* Hook. *fl. Ic. Pl. t.* 1444; *Prain, l.c.* 342.

A climbing epiphyte eventually a tree 20 ft. tall. Leaves elliptic acuminate, base cuneate, 3 to 4 in. long, 1.25 to 1.75 in. wide; petioles .75 in. long. Racemes 6 in. long; pedicels .5 in. long. Calyx entire, .4 in. wide. Corolla trumpet-shaped, 2 in. long, tomentose purple. Capsule brown, 2 in. long, .5 in. through or less. Seeds .25 in. long, linear-oblong; wings sub-equal. *Hab.* Mountain forests, rare. Perak, Taiping Hills at 2000 ft. altitude (Derry). *Distrib.* Borneo, Java.

2. MAZUS, Lour.

Small herbs stoloniferous. Leaves rosulate below. Flowers in a terminal raceme. Calyx campanulate, lobes 5, large leafy.

Corolla 2-lipped, tube short, upper lip erect ovate 2-fid, lower longer 3-fid, throat plicate forming a bilobed palate. Stamens 4. Capsule globose 2-valved included in calyx. Seeds many ovoid. Species 5, Asiatic and Australian.

(1) *M. rugosus* Lour. *Fl. Cochinchine*, 385; *Prain, l.c.* 343.

Leaves obovate-spathulate crenate, .75 to 1 in. long.; petioles short. Scapes several, 2 to 6 in. long, racemose. Calyx campanulate, .25 in. long, lobes ovate-lanceolate spreading in fruit. Corolla .3 in. long, tube and upper lip pale violet, mouth white. Capsule .2 in. long, included in calyx. *Hab.* Singapore, Botanic Gardens, a weed in some of the beds, probably accidentally introduced. *Distrib.* India, China, Malaya.

2. LINARIA, Linn.

Herbs. Leaves opposite or whorled below, alternate above. Flowers racemose (spicate or axillary). Sepals 5. Corolla-tube spurred in front; upper lip erect, 2-lobed, lower 3-lobed closed by the swollen palate. Stamens 4, didynamous; anther-cells parallel. Capsule ovoid or globose, 2-celled, each cell or one only opening by a pore. Species 130, Old World, temperate regions; rare in Asia.

(1) *L. alpina* Mill. *Dict. ed.* 8, No. 5; *Bot Mag. t.* 205.

Dwarf plant 3 to 6 in. tall. Leaves linear-oblong spathulate narrow, glaucous, .5 in. long, whorled fleshy. Raceme terminal; pedicels 2 to 3 times as long as calyx. Corolla 1 in. long, violet purple, palate orange, spur conic, 1 in. long. *Hab.* Malacca, Mt. Ophir (Hullett, April 1888). *Distrib.* Alps of Europe.

I have seen two specimens collected by Mr. Hullett, who got it, as he told me, on the rocks of the stream below the camp on Padang Batu. I failed to find it there myself. Mr. Hullett collected only in the Malay region, and had no European collections. No species of this type of *Linaria* is known from Tropical Asia, and it is, of course, impossible for the plant to have got to Mt. Ophir by human agency. I cannot account for this extraordinary distribution.

4. ADENOSMA, R. Br.

Hairy herbs creeping or erect, aromatic. Leaves rough, crenulate. Flowers axillary or spicate or racemose. Calyx deeply 5-lobed, upper ones largest. Corolla 2-lipped, upper lip erect, notched, lower broad, 3-lobed, blue. Stamens 4, didynamous, one cell of each anterior stamen or of all empty; style filiform winged upwards. Capsule ovoid or lanceolate, 4-valved. Seeds minute reticulate. Species 10, Indo-Malaya, Australia.

Flowers axillary.

Creeping plant (1) *A. ovatum*

Erect plant (2) *A. inopinatum*

Flowers in a long, slender spike, pale blue (3) *A. cæruleum*

Flowers in a dense cylindric or globose head, deep blue (4) *A. capitatum*

Flowers in a dense head of leafy bracts, all soft hairy (5) *A. hirsutum*

(1) ***A. ovatum* Benth. F.B.I. iv. 263; Prain, l.c. 344.**

Pubescent low creeping herb, 6 to 18 in. long. Leaves ovate acute serrate, base shortly cuneate, .75 in. long, .5 in. wide. Flowers axillary sessile. Sepals nearly free, in fruit large, membranous, .35 in. across, 3 outer ovate cordate, inner narrow, all .2 in. long. Corolla light blue. Capsule lanceolate concealed by sepals. *Hab.* On paths and banks, Singapore Gardens, paths in jungle; Bukit Timah. Malacca (Griffith). Dindings, Gunong Tungul. Penang Waterfall (Curtis). Kelantan, Kota Bharu; Kwala Aring (Yapp). *Distrib.* Indo-China, Malaya.

(2) ***A. inopinatum* Prain, l.c. 344.**

A stiff erect herb; stem rough hairy, 18 in. tall, purplish sometimes branched. Leaves ovate acute serrate, base broad shortly cuneate, sparsely hairy, 1 to 1.5 in. long, .75 to 1 in. wide; petioles .3 in. long. Flowers solitary axillary sessile only. Bracts shorter than calyx. Sepals almost free in fruit, the outer three enlarged, .25 in. wide, ovate-lanceolate, inner narrow, all .25 in. long. Corolla .25 in. long, purplish white or nearly quite white, tube outside violet with a violet spot in the hairy throat. Capsule dilate at base, beaked above. *Hab.* In grassy spots. Singapore (Anderson); Tanglin. Malacca, Ayer Panas (Griffith).

I have only seen a specimen of Anderson's of the type. The plants I identify with it have no relationship whatever to *A. ovatum*, but are close to, and may be a form of, *A. cæruleum*.

(3) ***A. cæruleum* R. Br. Prodr. 443; Prain, l.c. 345.**

Erect pubescent aromatic herb, 1 to 2 ft. tall, little branched. Leaves ovate acute crenate, base round and minutely cuneate, 1 to 1.5 in. long, 1 in. wide; petioles .2 in. long, sparsely hairy. Flowers in lower part axillary solitary, above crowded racemose. Sepals lanceolate, inner ones linear little altered in fruit. Corolla .25 in. long, pale lavender blue. Capsule base dilate, beaked, as long as sepals. *Hab.* Common in grassy spots, Singapore (Cuming, Wallich). Malacca, Pulau Besar (Maingay), Pahang, Pekan. Selangor, Batu Caves. Negri Sembilan, Bukit Tampin (Good-enough); Gunong Angsi; Bukit Kupayiang (Cantley). Dindings. Perak, Temengoh; Bukit Kamiri (Wray). Tringganu (Yapp). Tomoh (Machado). Penang Hill (Curtis). *Distrib.* Indo-China, Bangka, Borneo, Australia. *Native names:* Timbak Tasek; Magun Jantan; Rumpu Gumbok.

(4) ***A. capitatum* Benth. F.B.I. iv. 264; Prain, l.c. 345.**

A branched aromatic herb about 1 to 2 ft. tall, sparsely rough hairy on stems and nerves of leaf. Leaves ovate acuminate serrate, base cuneate, 1 to 2 in. long, .5 to .75 in. wide; petioles about .1 in. long. Flowers bright blue in dense terminal globose or cylindric hairy heads, .5 in. long with numerous leafy bracts at the base. Sepals villous, .25 in. long. Corolla little longer. Capsule ovoid, .2 in. long. *Hab.* Sandy places by roadsides and

on heaths. Common. Singapore, McPherson Road; Serangoon Road; Reservoir. Pahang, Pekan. Malacca, Sungei Hudang; Ayer Keroh; Merlimau (Derry); Chabau; Selandor (Cantley). Negri Sembilan, Kwala Pemas; Tampin. Selangor, Salak, South Road (Seimund). Province Wellesley (King). Penang, Pulau Betong (Curtis). Lankawi, Kesap (Curtis). *Distrib.* Siam. *Native names:* Rumput Kuching-Kuching; Tasek-Tasek; Timbah Tasek; Ruku hutan; Rumput Tolau.

(5) **A. hirsutum** Kurz, *Journ. As. Soc. Beng.* xiv. 2, p. 143; *Prain, l.c.* 346.

Robust, almost woody herb villous woolly. Leaves elliptic or obovate crenulate-serrate blunt, base cuneate, 1 to 2 in. long, 1 to 1.5 in. wide, hairy all over; petioles very short or 0. Flowers blue in dense cylindric spikes 2 in. long, nearly 1 in. through with leafy bracts at base. Sepals linear, .25 in. long. Corolla little longer. Capsule ovate beaked. *Hab.* Sandy country in the north. Province Wellesley, Permatang Bertam; Kubang Ulu (Curtis) Lankawi, Terutau (Curtis). Setul heaths (Ridley). *Distrib.* Sumatra, Borneo.

5. HERPESTIS, Gaertn.

Glabrous marsh herb. Leaves entire (or toothed or multifid). Flowers axillary (or racemose). Calyx 5-lobed, upper lobes largest, inner ones narrow. Corolla hardly 2-lipped, upper lip 2-lobed, lower 3-lobed, tube cylindric. Stamens 4, didynamous; anther-cells contiguous parallel. Capsule globose or ovoid, 2- to 4-valved. Seeds many minute. Species 50, chiefly South American.

(1) **H. monniera** H. B. and K. *Nov. Gen. and Sp.* ii. 366; *Prain, l.c.* 351.

Glabrous succulent herb 4 to 6 in. or more tall. Leaves obovate-spathulate sessile, blunt, .5 to .75 in. long. Flowers peduncled, .75 to 1 in. long. Sepals nearly free, .2 to .3 in. long, upper one ovate. Corolla .4 to .6 in. long, white. Capsule ovoid. *Hab.* In wet spots, often in villages. Singapore, Serangoon; Rochor; Telok Kurau. Malacca (Hervey). Selangor, Salak, South Road (Seimund). Penang, Bagian Jennal (Curtis). Kelantan, Kamposa; Kota Bharu. *Distrib.* All tropics. *Native name:* Bremi.

6. LIMNOPHILA, R. Br.

Marsh and pool herbs aromatic usually hairy. Leaves gland-dotted, opposite or whorled, narrow generally sessile toothed where submerged, capillary multifid. Flowers solitary axillary sometimes by suppression of leaves forming terminal spikes or racemes. Calyx 5-lobed, lobes narrow acuminate. Corolla 2-lipped, upper lip entire or bifid, lower spreading, 3-lobed nearly equal, tube cylindric, violet or white. Stamens 4, didynamous included;

anther-cells discrete stipitate. Stigma bi-lamellate. Capsule ovoid or oblong. Seeds many. Species about 25, Asia and Australia.

Leaves not pinnatifid; marsh plants.

Flowers sessile.

Robust plant; leaves petioled, 2 to 3 in. long; nerves prominent . . . (1) *L. Roxburghii*

Robust; leaves sessile, 1 to 2 in. long, pubescent; nerves prominent . . . (2) *L. balsamea*

Slender glabrous plant; leaves under .5 in. long; nerves not conspicuous . . . (3) *L. micrantha*

Flowers pedicelled.

Leaves hairy.

Robust plant 2.5 ft. tall; flowers in axillary cymes . . . (4) *L. villifera*

Stout 6 to 8 in. tall; flowers paniced at top; leaves 1 in. long or more . . . (5) *L. hirsuta*

Dwarf, 4 to 6 in. tall; leaves .5 in. long; corolla violet; flowers solitary axillary. (6) *L. villosa*

Leaves glabrous, opposite.

Flowers solitary axillary.

Plant rather robust, many-flowered, flowers white . . . (7) *L. erecta*

Dwarf plant much branched, viscid-hairy . . . (8) *L. viscida*

Dwarf plant glabrous; flowers axillary solitary . . . (9) *L. pygmæa*

Plant slender elongate; flowers few . . . (10) *L. laxa*

Leaves whorled half-amplexicaul; flowers racemose . . . (11) *L. gratissima*

Leaves, at least lower ones, lobed or multifid; aquatics.

Flowers solitary sessile . . . (12) *L. sessiliflora*

Flowers forming an interrupted spike, sessile . . . (13) *L. heterophylla*

Flowers pedicelled, small plant; leaves all multifid (14) *L. Griffithii*

(1) *L. Roxburghii* Don, *Gen. Syst.* iv. 543; *Prain, l.c.* 347.

Stout herb, aromatic, rootstock creeping; stems 1 to 2 ft. tall, pubescent or glabrous. Leaves elliptic or ovate blunt crenulate, base cuneate; nerves and reticulations hairy, prominent; 1.5 to 4 in. long, 1 to 2 in. wide; petioles .75 to 1 in. long. Flowers sessile in axillary heads. Calyx hairy, .2 in. long, lobes lanceolate. Corolla .35 in. long, purplish blue, throat yellow. Capsule .2 in. long, elliptic. *Hab.* Not common, in muddy places. Perak, Temengoh; Tapah (Ridley). Lankawi, Kwah (Curtis). *Distrib.* India to China, Philippines.

(2) *L. balsamea* Benth. *DC. Prodr.* x. 386; *Prain, l.c.* 348.

A densely hairy herb, stout creeping and ascending, .6 in. to 2 ft. tall. Leaves sessile elliptic, narrowed to base, crenulate; nerves few elevate, 3 to 5 pairs; 1 to 2 in. long, .5 to 1 in. wide. Heads of flowers short peduncled. Calyx hairy, .15 in. long, lobes lanceolate, finely acuminate. Corolla .35 in. long, blue. Capsule .2 in. broad, elliptic. *Hab.* In wet muddy spots. Perak, Goping (Kunstler), rare. *Distrib.* Indo-China.

(3) *L. micrantha* Benth. *DC. Prodr.* x. 387; *Prain, l.c.* 348.

A slender herb rooting below, glabrous, 3 to 7 in. long. Leaves

fleshy, .25 to .45 in. long, .1 in. wide, oblong narrowed to base, sessile. Flowers solitary axillary; pedicel very short. Calyx hairy .06 in. long, lobes lanceolate subulate. Corolla .2 in. long, purple. Capsule obovate, .08 in. long. *Hab.* Not common, damp spots in rice fields, in the north, Pahang, near Pekan. Kedah, Alor Sta. Setul (Ridley). *Distrib.* India, Cambodia.

(4) *L. villifera* Miq. *Fl. Ned. Ind.* ii. 682.

Long stout hairy unbranched plant, 2.5 ft. tall. Leaves herbaceous, rather stiff sessile lanceolate blunt, hairy with nerves prominent beneath, 1.5 in. long, .4 in. wide. Flowers in upper axil in small hairy cymes, .1 to .15 in. long; pedicels slender, all hairy. Sepals lanceolate acuminate hairy, .1 in. long. Corolla .5 in. long, pale blue. *Hab.* Perak, Sungei Rayah (Kunstler). Rare. *Distrib.* Sumatra.

(5) *L. hirsuta* Benth. *DC. Prodr.* x. 388; *Prain, l.c.* 348.

A rather stout hairy herb, 6 to 8 in. tall. Leaves opposite or whorled elliptic, linear-oblong or spatulate serrulate, 1.5 to 2.5 in. long, .25 in. wide, sessile. Flowers solitary axillary and paniced at the top; pedicels .2 to .75 in. long. Calyx .3 in. long hairy, lobes lanceolate acuminate. Corolla .5 in. long. Capsule orbicular, .25 in. long. *Hab.* Not common in damp spots. Pahang, Gunong Senyum (Evans). Malacca. Perak (Scortechini). *Distrib.* Indo-China, Malaya, China.

(6) *L. villosa* Bl. *Bijdr.* 750; *Prain, l.c.* 348. *L. pulcherrima* Hook. *fil. F.B.I.* iv. 267.

A small pubescent aromatic herb, 4 to 6 in. tall. Leaves elliptic to lanceolate crenate sessile narrowed to base, .5 in. long, .12 in. wide. Flowers solitary, axillary. Calyx green, hairy, .15 in. long, lobes subulate. Corolla .2 in. long, tube outside greenish with red streaks, inside white, lobes deep violet. Stamens white. Capsule ovoid, .15 in. long. *Hab.* Common in ditches and damp spots. Singapore, Tanglin; Chan Chu Kang; Reservoir. Pahang, Pekan. Malacca, Bukit Panchur and Selandor (Cantley); Malaka Pindah (Hervey). Negri Sembilan, Tampin (Burkill); Bukit Tangga Pass. Perak, Selama (Scortechini); Thaiping (Wray). Province Wellesley, Butterworth (Curtis). Penang, Telok Bahang (Curtis). Lankawi, Burau. Perlis, Kanga. Setul. Patani (Annandale). *Distrib.* Java, Sumatra. *Native names:* Bremi, Bremi hutan; Kerak kerak; Nasi putih; Sabueh or Sibueh Batu; Rumput Jari Lipan. *Use:* Medicine.

(7) *L. erecta* Benth. *DC. Prodr.* x. 388; *Prain, l.c.* 349.

Erect branched glabrous herb, 6 to 8 in. tall. Leaves linear-oblong acute, toothed at tip, narrowed to base, .5 to 1 in. long, .2 in. wide, sessile. Flowers axillary solitary white; pedicels .1 in. long. Calyx glabrous, .15 in. long, lobes lanceolate acuminate. Corolla .2 in. long. Capsule ovoid, .15 in. long. *Hab.* Wet spots, streams and pools. Pahang, Tembeling River. Negri Sembilan,

Perhentian Tinggi. Selangor, Sungei Buluh; Rawang. Perak, Ulu Bubong (Kunstler); Ulu Temengoh; Tapah; Sungei Siput. Kelantan, rice fields, Kota Bharu (Ridley). *Distrib.* India, China, Cambodia.

(8) ***L. viscida*** Ridl. *Journ. Roy. As. Soc. S. Br.* 59, p. 142.

Herb 6 in. tall, much-branched, glandular scabrid. Leaves lanceolate entire, 2 in. long, .5 in. wide. Flowers very numerous, sub-sessile. Sepals .12 in. long, viscid glandular. Corolla white very small, sparsely hairy. Capsule oblong, .12 in. long. *Hab.* Perlis, Kanga, in fields (Ridley). *est Stau. rooyne glaucu Ners Alu Huma Bay*

(9) ***L. pygmæa*** Hook. *fil. F.B.I.* iv. 268; *Prain, l.c.* 349. *Herpstis pygmæa Griff. Notulæ*, iv. 104.

Glabrous, dwarf, 4 to 6 in. tall, creeping. Leaves opposite sessile, oblong-lanceolate, acute, sub-serrate. Flowers axillary solitary; pedicels as long as calyx or longer. Calyx .13 in. long, hairy, lobes subulate lanceolate. Corolla .2 in. long. Capsule .15 in. long, ovoid. *Hab.* Malacca (Griffith and Cuming). *Distrib.* Mergui.

I have seen no specimens from our area.

(10) ***L. laxa*** Benth. *DC. Prodr.* x. 388; *F.B.I.* iv. 267.

Slender flaccid plant about 12 in. long, hairy. Leaves in remote pairs 1 to 1.5 in. apart, lanceolate blunt narrowed to base, crenate serrate, glabrous, .4 to .5 in. long, .25 in. wide; petioles winged to base. Flowers solitary axillary; pedicels slender, .24 in. long, hairy. Sepals very narrow acuminate, hairy, .1 in. long, in fruit wider ovate subulate. Corolla short. Capsule ovoid shorter than the calyx. *Hab.* Damp open country, rare. Singapore, Selitar. Malacca, Ayer Keroh. Tringganu (Yapp). *Distrib.* Tenasserim, Ceylon.

(11) ***L. gratissima*** Bl. *Bijdr.* 749; *Prain, l.c.* 349.

Erect stout glabrous herb 1 to 2 ft. tall, simple or rarely branched. Leaves opposite and ternate, linear-oblong half-amplexicaul, serrulate acute, sessile, 1.5 to 2.5 in. long, .25 to .5 in. wide. Racemes axillary and terminal, many-flowered, sometimes paniculate to 12 in. long or flowers solitary; pedicels .5 to 1 in. long. Calyx .3 in. long, lobes lanceolate acuminate in fruit hemispherical. Corolla .5 in. long, light blue. Capsule oblong acute, .3 in. long. *Hab.* In still water in dense forest; rare. Malacca (Maingay). Perak, Goping (Kunstler); Tapah (Wray). *Distrib.* Indo-Malaya, Australia.

(12) ***L. sessiliflora*** Bl. *Bijdr.* 750; *Prain, l.c.* 350.

Aquatic glabrous herb 4 to 8 in. tall. Leaves 3 to 6 in a whorl all pinnatisect or uppermost opposite linear-spathulate toothed, usually an inch long. Flowers axillary solitary sessile or shortly pedicelled. Calyx .3 in. long, lobes ovate-acuminate, tube in fruit hemispheric. Corolla .5 in. long, pink. Capsule orbicular

swollen, .2 in. through. *Hab.* Lankawi, rice-fields (Curtis). *Distrib.* India, Cambodia, Java, Philippines, China.

(13) **L. heterophylla** Benth. var. *reflexa* Hook. *fil.* *F.B.I.* iv. 270.

Aquatic slender herbs, 1 to 1.5 ft. long. Leaves, lower ones submerged in whorls of 4 to 6 narrow spatulate laciniate, .5 in. long, .05 in. or less wide; upper leaves linear-spathulate half-amplexicaul, .5 in. or more long, crenulate or entire, lowest capillary pinnatifid. Flowers solitary axillary, lower ones pedicelled, upper ones sessile forming an interrupted spike. Calyx .25 in. long, lobes ovate, tube hemispheric in fruit. Corolla .4 in. long, white tipped mauve or pale violet with darker stripes. Capsule sub-globose .3 in. long. *Hab.* In pools and rice fields, base submerged. Malacca (Cuming). Lankawi (Curtis). *Distrib.* India, Siam, Borneo, Japan and China.

(14) **L. Griffithii** Hook. *fil.* *F.B.I.* iv. 271; *Prain, l.c.* 350. *L. sessiliflora* Griff. *Notulæ*, iv. t. 418, f. 5 (*not of Blume*).

A very small tufted aquatic 1 to 2 in. long. Leaves densely whorled multifid, .2 to .3 in. long. Flowers axillary solitary; pedicels .5 in. long. Calyx .1 in. long with short teeth. Corolla white, .4 in. long, .2 in. across. *Hab.* Muddy water in pools. Malacca (Griffith, Cuming). Perak, Goping (Kunstler).

7. VANDELLIA, Linn.

Dwarf herbs. Flowers small axillary or racemed. Calyx 5-lobed not winged. Corolla 2-lipped, upper lip bifid or emarginate, lower 3-lobed, tube cylindric. Stamens 4 didynamous, anterior pair with arched filaments appendaged near base; anthers contiguous in pairs under upper lip. Fruit globose, rarely (*V. pedunculata*) cylindric. Species 30, Indo-Malaya and China, one Europe.

Capsule small, globose.

Calyx very shortly lobed (1) **V. crustacea**

Calyx deeply 5-fid nearly to base.

Plant hairy, erect (2) **V. hirsuta**

Plant hairy, procumbent (3) **V. mollis**

Glabrous or only sparsely hairy

Leaves sessile; nerves hairy (4) **V. scabra**

Leaves sessile quite glabrous, succulent (5) **V. multiflora**

Leaves petioled, sparsely hairy or not; tall

slender plant (6) **V. elata**

Capsule cylindric, much longer than calyx (7) **V. pedunculata**

(1) **V. crustacea** Benth. *Scroph. Ind.* 35; *Prain, l.c.* 355.

Small-branched herb generally glabrous about 3 in. tall, sometimes drawn up taller. Leaves ovate or lanceolate entire or serrate, .5 to .75 in. long, .25 to .5 in. wide. Flowers axillary; pedicels slender .5 to 1 in. long. Calyx .1 in. long, lobes keeled green,

tipped red-hairy. Corolla-tube outside violet, inside white with violet streaks on lobes, a yellow bar from below lower lip; limb white edged violet, deep purple blotch at base of mid-lower lobe. Stamens, anthers and processes tipped violet. Capsule ovate-oblong, .12 in. long. *Hab.* Very common in waste ground, sandy heaths and pathways. Singapore, Tanglin; Bukit Timah. Johor, Gunong Pulai; Pahang, Pekan; Kuantan (Fox). Malacca (Hervey). Selangor, Semangkok Pass. Perak (Curtis). Penang, Sepoy lines (Curtis). Tringganu, Bundi (Rostados). Perlis. *Distrib.* Cosmopolitan. *Native name*: Kerak Nasi.

(2) **V. hirsuta** Benth. *Scroph. Ind.* 36; *Prain, l.c.* 356.

Dwarf hairy herb 3 to 4 in. tall with horizontal spreading branches as long. Leaves ovate and oblong blunt, crenate or blunt-serrate often purple, 1 to 2 in. long, .5 to .6 in. wide; petioles under .1 in. long or 0. Flowers small in a lax terminal raceme; pedicels .1 in. long in flower to .3 in. long in fruit. Sepals .08 in. long, hairy. Corolla .15 in. long, bluish white. Capsule globose, .08 in. long. *Hab.* Weed, open sandy spots. Singapore, Tanglin, Johor, Kota Tinggi. Pahang, Pekan; Tahan River. Perak, Temengoh; Ulu Bubong (Kunstler). Kelantan, Chaning. *Distrib.* Indo-Malaya, China.

(3) **V. mollis** Benth. *Scroph. Ind.* 37; *Prain, l.c.* 356.

A creeping rooting white-hairy herb as much as 1 ft. long or even more, softly villous all over. Leaves ovate or oblong blunt crenate-serrate, 1 to 1.5 in. long, .5 to .75 in. wide; petioles .2 in. long or less. Flowers axillary and terminal; pedicels and calyx villous. Sepals .4 in. long, subulate lanceolate. Corolla .5 to .6 in. long, tube white, upper lip brown, lower yellow. Capsule oblong, .2 in. long. *Hab.* Rare, on pathways. Selangor, Rawang. Perak, Temengoh (Ridley). *Distrib.* India to China, Sumatra, Java.

(4) **V. scabra** Benth. *Scroph. Ind.* 36; *Prain, l.c.* 356.

Tufted branched herb sparsely white-hairy, 3 to 5 in. tall. Leaves sessile ovate entire or crenulate, base round, hairy on nerves, .3 to .6 in. long, .3 in. wide. Flowers axillary and terminal; pedicels slender, .3 in. long in flower, 1 in. long in fruit. Calyx .3 in. long, glabrous, lobes lanceolate blunt. Corolla .3 in. long, upper lip purplish, lower white, 2 yellow spots in throat. Capsule globose longer than sepals. *Hab.* Sandy spots. Singapore, Telok Kurau. Negri Sembilan, Seremban (Ridley). Province Wellesley (King). Tringganu, Bundi (Rostados). *Distrib.* Africa and Asia.

(5) **V. multiflora** Don. *Gen. Syst.* iv. 549; *Hook. fil. F.B.I.* iv. 280.

Glabrous succulent erect, 3 to 6 in. tall. Leaves oblong or ovate entire sessile or shortly narrowed into a petiole. Flowers .12 in. long, racemed terminal; pedicels .18 to .25 in. long (in fruit). Sepals lanceolate acuminate. Corolla very small.

Capsule orbicular longer than sepals. *Hab.* Rare, sandy spots in the north. Perlis, Kanga (Ridley). *Distrib.* India.

(6) *V. elata* Benth. *Scroph. Ind.* 36; *Prain, l.c.* 357.

Slender erect glabrous or sparsely hairy herb about 6 in. to 1 ft. tall. Leaves ovate crenate-toothed acute, base cuneate, .3 to .5 in. long, .25 in. wide; petioles .15 to .25 in. long. Flowers axillary and racemose, terminal; pedicels .3 to .5 in. long. Sepals lanceolate sparsely hairy, .09 in. long. Corolla violet with yellow spot on lip, very small, .1 in. long. Capsule oblong, .12 in. long, as long as sepals. *Hab.* Open ground in dry spots and in rice fields. Singapore, Garden weed; Galang; Government Hill. Malacca, Chabau, rice fields. Kedah, Alor Sta, rice fields (Ridley). *Distrib.* Tenasserim.

(7) *V. pedunculata* Benth. *Scroph. Ind.* 37; *Prain, l.c.* 357.

Glabrous slender sometimes creeping, stems up to 10 in. long, weak. Leaves ovate blunt, obscurely toothed, .5 in. long, .4 in. wide; petioles short. Flowers axillary solitary and in terminal racemes; pedicels .15 in. long, slender. Sepals narrow lanceolate, .25 in. long. Corolla violet with yellow spots on lip, or white. Capsule linear lanceolate, .5 in. long. *Hab.* Wet spots; not rare. Singapore, Government Hill. Johor, Batu Pahat. Selangor, Rawang; Ulu Gombak. Perak, Tanjong Malim; Temengoh; Teluk Anson (Ridley). Penang, Pulau Butong (Curtis). Lankawi, Terutau (Curtis). Setul. Kelantan, Chaning. Patani (Annandale). *Distrib.* Indo-Malaya.

8. TORENIA, Linn.

Herbs glabrous or pubescent, erect or creeping. Leaves opposite, generally serrate ovate. Flowers showy, blue, purple, yellow or rarely white, axillary or in terminal racemes of few flowers. Calyx 2-lipped or 3- to 5-toothed, often winged. Corolla 2-lipped, upper lip bifid, lower spreading, 3-lobed, tube cylindric, curved. Stamens 4, didynamous insert on tube; anthers connate in pairs, cells confluent. Ovary 2-celled. Fruit a linear or oblong septicidal capsule. Species 20, Asia, Africa and America.

The popular pot-plant *T. Fournieri* from Siam (often erroneously called *T. asiatica*), with pale blue flowers, the lips tipped deep purple, has here and there escaped from gardens, as at Ayer hitam and elsewhere in Penang, but has not as yet established itself.

Calyx distinctly winged.

Creeping plant; calyx orbicular; flowers small, red-brown and white

(1) *T. polygonoides*

Erect plants; calyx longer than broad.

Calyx wings broad; corolla hardly exsert; flowers pale blue

(2) *T. peduncularis*

Calyx wings rather broad; corolla hardly exsert; flowers pale blue, 2 dark spots

(3) *T. bimaculata*

Calyx-wings narrow; corolla exsert blue . . . (4) *T. ciliata*
 Calyx hardly winged.

Flowers axillary.

Glabrous prostrate; corolla deep purple, large . . . (5) *T. atropurpurea*

Hairy, creeping; corolla small, light blue . . . (6) *T. cælestis*

Flowers racemose, yellow, plant hairy . . . (7) *T. flava*

(1) *T. polygonoides* Benth. *Scroph. Ind.* 39; *Prain, l.c.* 352.

A slender prostrate creeper in grass, 12 or more in. long, glabrous. Leaves orbicular-ovate serrate, .4 to .5 in. long, .3 to .4 in. wide; petioles .25 in. long. Flowers 2 to 4 on short axillary peduncles. Calyx tubular winged. Corolla .25 in. across, tube as long as calyx, white, upper lobes brown rarely entirely white. *Hab.* Common in grass plots and banks, whole peninsula. Singapore, Tanglin (a variety with white flowers); Galang. Pahang, Pasir Loyang, Pahang River. Malacca, Selandor; Alor Gajah. Selangor, Rantau Panjang (Kloss). Perak, Telok Anson; Gapis Pass (Curtis). Penang. Tringganu, Bundi (Rostados). Setul. *Distrib.* Cachar, Tavoy, Borneo. *Native names:* Kerak Merah; Terutap Batu.

(2) *T. peduncularis* Benth. *Wall. Cat.* 3956; *Prain, l.c.* 353. *T. edentula* Benth. *Bot. Mag. t.* 4229.

Branched herb 1 ft. tall; stem 4-angled hairy. Leaves ovate-lanceolate, base cordate, acuminate serrate, 1 to 2 in. long, .5 to 1 in. wide; petioles .5 to .75 in. long. Flowers axillary solitary, the uppermost 2 or 3 racemed; pedicels .3 in. long, lengthening to .5 in. long in fruit. Calyx lanceolate, .6 in. long, wings narrow, wider in fruit, .6 to 12 in. wide in flower, .3 in. wide in fruit. Corolla .75 in. long, little exsert, tube yellow, above light blue, lobes with darker blotches. *Hab.* By streams in forests. Malacca, Bukit Panchur (Cantley). Negri Sembilan, Bukit Kupayiang (Cantley). Dindings, Lumut. Perak, Temengoh; Kwala Dipang; Batang Padang. Penang (Schomburgk). Kedah Peak (Robinson). Kelantan, Kwala Aring (Yapp). *Distrib.* Indo-China, Java, Timor, Nicobars. *Native names:* Kelawat; Kula lawat; Rulang hutan.

(3) *T. bimaculata* Ridl. *Journ. F.M.S. Mus.* x. 149.

Annual, 12 in. tall; young parts pubescent. Leaves ovate acute, base decurrent often oblique, glabrous when adult, serrate, 1 in. long, .5 in. wide; petioles .25 in. long. Flowers 1 to 5 in terminal umbel; pedicels .5 in. long. Calyx .4 to .5 in. long, ellipsoid, base decurrent on pedicel, distinctly winged, hairy on the edge at tip. Corolla-tube as long as calyx, limb bilabiate, pale blue with a dark purple spot on each side of the lower lip, mouth of tube yellow inside. *Hab.* Kelantan; river banks at Chaning (Ridley).

(4) *T. ciliata* Sm. *Rees, Cyclop.* v. 36; *Prain, l.c.* 353.

Closely resembles *T. peduncularis*, but is usually bigger. Leaves larger and more serrate, the calyx slightly narrower and wings

narrower distinct. Flowers light blue. *Hab.* Tracks in woods and open country. Malacca, Relau. Dindings, Telok Serah. Perak, Telok Pinang. Kedah, Yan (Ridley). Kelantan River (Down). Rahman, Kota Bharu (Gwynne-Vaughan). Penang, Penara Bukit; Waterfall (Wallich, Curtis). Perlis (a nearly glabrous form). *Distrib.* Sumatra, Timor.

(5) *T. atropurpurea* Ridl. *Journ. Roy. As. Soc. S. Br.* 49 p. 24; *Bot. Mag. t.* 8388. *T. asiatica* Prain, *l.c.* 354 (*partly*).

Stems creeping and rooting 2 ft. long branched, glabrous. Leaves ovate-deltoid acute crenate-serrate, base broad, 1 to 2 in. long, .5 to 1 in. wide; petioles slender, .5 in. long. Flowers solitary, axillary; peduncles 1 in. long. Calyx .4 in. long, narrow tubular, lobes acute. Corolla deep violet purple, 1 in. long, tube long narrow, lobes rounded. Capsule oblong, .5 in. long. *Hab.* Banks in mountain forests. Selangor, Semangkok Pass. Perak, Thaiping Hills at 2500 ft. altitude; Bujong Malacca (Ridley).

var. *bicolor* Ridl. Lower part of tube deep purple, limb cream-colour, Perak, Ulu Batang Padang (Ridley).

The figure in the *Botanical Magazine* is much lighter in colour than usual.

(6) *T. cælestis* Ridl. *Journ. Roy. As. Soc. S. Br.* 49, p. 23. *T. Benthamiana* Prain, *l.c.* 354 (*partly*).

Slender creeping plant; stem and leaves pubescent-hairy. Leaves ovate dentate, base broad, .75 in. long, .5 in. wide; petioles .2 in. long. Flowers solitary terminal; peduncles slender, 1.25 in. long. Calyx bilobed not winged hairy, .5 in. long. Corolla .75 in. long, light blue. *Hab.* Pathways in grassy spots, local. Johor, Kota Tinggi (Ridley).

(7) *T. flava* Ham. Wall. *Cat.* 3957; Prain, *l.c.* 354.

Erect branched herb 6 in. to 1 ft. tall, hairy; branches 4-angled. Leaves ovate, base wide cuneate, edge crenate, 1 to 1.5 in. long, .7 to 1 in. wide. Flowers racemed terminal; pedicels .2 in. long. Calyx narrow tubular not winged hairy. Corolla .75 in. long, bright yellow. *Hab.* Perak (Kunstler), Telok Pinang, one plant on a path in a wood (Ridley). *Distrib.* Indo-China, Malaya.

9. ARTANEMA, Don.

Tall herbs; stems 4-angled, glabrous. Leaves opposite lanceolate. Flowers large blue or pink and white paired in terminal racemes. Bracts leafy. Calyx-lobes acuminate. Corolla 2-lipped, upper lip broad emarginate, lower 3-lobed tube cylindric. Stamens 4, didynamous, posterior pair short, anterior long; anther-cells confluent at base. Style slender; stigma 2-lamellate. Capsule globose septicidal, valves 2; seeds many. Species 3 or 4, Africa, Asia, Australia.

(1) **A. angustifolium** Benth. *Scroph. Ind.* 39; *Prain, l.c.* 358. *A. sesamoides* Benth. *l.c.*; *Prain, l.c.*

About 3 ft. tall. Leaves sessile lanceolate, acuminate at both ends, entire or slightly serrate, 3 to 4 in. long, .25 to .75 in. wide. Racemes 6 to 9 in. long; flowers opening 1 or 2 at a time; pedicels .15 in. long. Calyx .2 in. long. Corolla 1 in. long, violet with central purple spot on lower lobe. Anthers purple. Capsule globose. *Hab.* In marshes open country. Singapore (Wallich, Cuming). Johor, Pulau Kukub; Serom. Pahang, Pekan. Muar (Feilding). Selangor, between Sepang and Labu. Perak, Simpang (Wray); Kwala Kenering. Dindings, Bruas. Kelantan, Chaning. Penang, Balik Pulau; Pulau Betong (Curtis). Perlis. *Distrib.* Siam. *Native names*: Poko Kelulut Gajah; Seluang Mudik; Sesawi Pasir.

I doubt if *A. sesamoides* Benth. is distinct except as a local variety; anyway, all the plants seen here are the same, and the *A. angustifolium* of Benth.

10. CURANGA, Juss.

A diffuse more or less creeping herb. Leaves opposite ovate crenate. Racemes terminal and axillary. Calyx 4-lobed upper and lower lobes large and round, laterals small and narrow. Corolla small, 2-lipped, upper lobe emarginate, lower 3-lobed longer. Stamens 2, anthers connate; staminodes clubbed. Fruit an orbicular septicidal capsule covered by the accrescent sepals. Species 2, South-east Asiatic.

(1) **C. amara** Jussieu, *Ann. Mus.* ix. 320; *Prain, l.c.* 359.

About 6 in. to 1 ft. or more tall. Leaves .5 to 2 in. long, .4 to 1.5 in. wide; petioles .2 to 1 in. long. Racemes short or rather long. Calyx, upper lobe .25 in. long in flower to .5 in. long in fruit, ovate blunt. Corolla shortly projecting white and brown. *Hab.* Borders of woods in shady spots. Pahang, Pekan and many spots up river; Telom. Selangor. Batu Caves. Perak, Hermitage Hill; Temengoh; Telok Pinang. Kelantan, Chaning. *Distrib.* Indo-Malaya and Indo-China. *Native names*: Mempadu Tana; Labung; Gelumah Susu. *Use*: The leaves when fresh are very bitter and used in medicine.

11. BONNAYA, Link and Otto.

Glabrous small herbs. Leaves opposite serrate. Flowers solitary axillary or terminal racemose small. Calyx 5-lobed, lobes narrow. Corolla 2-lipped, upper lip bifid, lower larger spreading 3-lobed, tube cylindric. Stamens 2, upper pair only perfect; anthers contiguous, lower pair reduced to 2 clubbed hairy staminodes. Stigma bilamellate. Capsule narrow septicidal. Seeds rugose. Species about 10, South-east Asiatic.

- Tufted erect herbs; flowers very small white with pink spots; leaves sessile very serrate . . . (1) *B. brachiata*
 Stoloniferous; flower large broad violet; leaves petioled serrate . . . (2) *B. reptans*
 Tufted, leaves slightly serrate or nearly entire; flowers blue . . . (3) *B. veronicæfolia*

(1) *B. brachiata* Link and Otto, *l.c. Pl. Sel.* i. 25, t. 11; Prain, *l.c.* 360.

Small erect branched herb 2 to 6 in. tall. Leaves oblong obtuse or acute, deeply serrate with close set mucronate teeth, .5 to .75 in. long, sessile. Flowers on an elongating raceme about 8 to 10 in pairs. Sepals nearly free, .15 in. long. Corolla white, lower lip spotted pink, .25 in. long. Capsule slender, .5 to .6 in. long. *Hab.*



FIG. 119.—*Bonnaya reptans*.

Very common in damp spots by streams. Singapore (Wallich); Tanjong Katong. Pahang, Pekan. Sungei Ujong (Cantley). Perak, Temengoh; Tapah. Province Wellesley, Tasek Gelugur. Penang, Sepoy lines (Curtis). Kedah, Yan. *Distrib.* India, China, Malaya. *Native name*: Kerak Kerak Jantan.

(2) *B. reptans* Spreng. *Syst.* i. 41; Prain, *l.c.* 360.

A tufted stoloniferous herb, stolons 6 to 12 in. long. Stems erect, 4 in. tall. Leaves obovate-oblong serrate, tip round, base narrowed, sessile or petioled, .5 in. long, .25 in. wide, on stolons; .1 in. long, .5 in. wide on the erect stems; petioles .5 in. long. Racemes eventually 3 in. long. Flowers 12, in pairs. Calyx .3 in. long. Corolla .75 in. long, upper lip and tube white, lower violet, darkest in mouth. Fertile stamens white, anthers edged purple. Staminodes projecting to mouth clubbed yellow running

down to an elevated disc covered with yellow hairs. Stigma 5-lobed, flat. Capsule .3 in. long, narrow cylindric acuminate. *Hab.* Common in damp grassy spots by streams. Singapore, Chan Chu Kang; Bukit Panjang; Tanglin. Pahang, Pekan; Tahan River; Raub (Machado). Selangor, Ginting Bidai (Kloss). Perak, Temengoh; Kwala Kangsa. Kedah, Alor Sta. *Distrib.* India, China, Malaya.

(3) **B. *veronicaefolia*** Spreng. *Syst.* i. 41; *Prain*, l.c. 361.

Tufted herb about 6 in. tall. Leaves rather flaccid sessile or nearly so oblong blunt serrulate or nearly entire. Racemes under 6 in. long. Sepals .2 in. long. Corolla .25 in. long, tube white, limb pale violet, upper lobe lanceolate linear, lower much wider broadly 3-lobed. Stamens white. Staminodes free portion orange hairy, tips recurved. Capsule narrow cylindric. *Hab.* Damp grassy spots. Singapore, Angmukio; Chan Chu Kang. Johor, Serom. Pahang, Pekan; Telom. Malacca (Hervey). Negri Sembilan, Burunang (Cantley). Selangor. Perak, Tapah (Wray). Penang (Deschamps); Balik Pulau and about the town. Kelantan, Kampos. Perlis, Kanga. Setul. *Distrib.* India, China, Malaya. *Native names:* Kerak-Kerak Jantan; Kerak-Kerak Merah; Chachang.

var. *grandiflora* Hook. *fl. F.B.I.* iv. 285. A more robust plant with much bigger leaves. Flowers light blue. *Hab.* Damp spots, rarer. Malacca (Griffith). Perak, Thaiping (Wray). Kedah, Alor Sta. Kelantan, Kota Bharu.

var. *verbenæfolia* Hook. *fl. F.B.I.* iv. 285. Slender plant 1 ft. tall or nearly with long internodes, hardly at all branched. Leaves narrow oblong nearly or quite entire. Raceme long, lax in fruit. Capsules far apart. *Hab.* Rare, in rice fields in the north. Perak (Scortechini). Kelantan, Kota Bharu (Ridley). Rahman, Kota Bharu (Gwynne-Vaughan).

12. MICROCARPÆA, R. Br.

A small tufted herb. Leaves oblong opposite. Flowers solitary axillary sessile. Calyx tubular 5-toothed, teeth at length spreading. Corolla-tube cylindric 5-lobed, lobes 4 short acute, 1 linear-oblong, all fringed with white hairs. Stamens 2 fertile; anthers 1-celled. Style shorter than calyx; stigma lateral curved. Capsule shorter than calyx-tube oblong-ovoid dehiscent into 2 valves. Seed oblong rugose. Species 1, Indian, Java, Australia.

(1) **M. *muscosa*** R. Br. *Prodr.* 435; *Ridl. Journ. Roy. As. Soc. S. Br.* 49, p. 25.

Stems slender, 1 to 4 in. tall, bright green. Leaves .1 in. long, blunt. Calyx pubescent, very small. Corolla hardly projecting beyond calyx, white; limb pale violet. *Hab.* Edges of ponds and damp spots, not rare; when submerged only 1 in. tall. Singapore, Reservoir. Perak, Temengoh (Ridley).

13. STRIGA, Lour.

Slender herbs parasitic on grass roots. Leaves narrow linear opposite below, alternate above. Flowers axillary or above spicate. Calyx 5-lobed, tubular. Corolla 2-lipped, upper lip bifid or emarginate, lower 3-lobed, tube slender incurved about the middle. Stamens 4, didynamous; anthers 1-celled. Style thickened upwards. Capsule oblong (or globose) loculicidal. Species 20, Eastern tropics.

(1) *S. hirsuta* Benth. DC. Prodr. x. 502. *S. lutea* Lour. Fl. Cochinchine, 22; Prain, l.c. 363.

Slender erect little or not branched pubescent herb, 3 to 6 in. tall. Leaves .5 in. long, spikes 2 to 4 in. long. Bracts longer than calyx. Calyx 10-ribbed, .25 in. long. Corolla usually light rose-pink, less commonly yellow or deep pink, .5 in. long. Capsule oblong. *Hab.* In grass plots common. Singapore, Gardens; Chan Chu Kang (pink); Kranji (yellow). Pahang, Pekan (yellow). Malacca, Gajah Berang (Herve). Negri Sembilan, Seremban; Bukit Tangga Pass (yellow). Perak, Kwala Kenering. Kelantan Kampos. Penang (Curtis). Perlis, Kanga. *Distrib.* India, Siam, Java. *Native name*: Rumpot Siku Siku.

14. CENTRANTHERA, R. Br.

Herbs, semiparasitical, stiff. Leaves opposite at least below, linear or oblong blunt. Flowers in terminal spikes (or axillary). Calyx spathaceous split on one side acuminate entire. Corolla-tube long curved, lobes 5- sub-equal. Stamens 4, didynamous; anthers contiguous in pairs. Capsule ovoid or sub-globose; valves entire. Seed reticulate. Species 4 or 5, Asiatic and Australia.

(1) *C. humifusa* Wall. Cat. 3883; Prain, l.c. 364.

Dwarf herb branched 3 to 6 in. tall, glabrous or pubescent. Leaves linear, .5 to .75 in. long. Flowers sub-sessile in a terminal spike. Calyx ovoid, .15 in. long. Corolla .3 to .5 in. long, upper half of tube brown, lobes at base yellow. Capsule sub-globose, .15 in. through. *Hab.* Grassy banks and roadsides, Singapore, Bukit Timah Road. Malacca (Griffith); Chabau; Ayer Panas. Setul, Heath. Lankawi, Tasek Enak (Haniff). *Distrib.* India to China, Malay islands.

15. SCOPARIA, Linn.

Shrubby herbs with twiggy branches. Leaves opposite (or whorled). Flowers small, white (pink or yellow) axillary solitary or binate. Calyx 4- to 5-lobed. Corolla small rotate, 4-lobed, lobes sub-equal, blunt, throat bearded, tube very short. Stamens 4, sub-equal; anthers sagittate. Ovary 2-celled. Stigma truncate. Capsule globose septicidal. Seeds many, small. Species 6 or 7, American.

(1) *S. dulcis* Linn. *Sp. Pl.* 116; *Prain, l.c.* 362.

A bushy herb woody below, about 2 ft. tall. Leaves lanceolate serrate narrowed to base, glabrous, 1 to 2 in. long, .5 in. wide or more. Flowers numerous, sub-panicled; pedicels slender, .25 in. long. Sepals 4, oblong. Corolla white, .12 in. across. Capsule globose, .15 in. through. *Hab.* A common weed in waste ground, dispersed by cattle and buffaloes, who eat it and scatter the seeds in the dung. Common all over the peninsula wherever cattle can go. Native of America. Now common in Africa and Malay islands. Not in any of the earliest collections but abundant before 1888, even far up the Pahang River. It was collected in India in 1843. *Native names:* Te'Macao; Dulis; Cha Padang; Bunga Baik Salam. *Use:* Medicinal.

ORDER CI. OROBANCHACEÆ.

Fleshy leafless parasitic white, brown or yellowish herbs. Stems clothed with scale-leaves. Flowers solitary or racemed, irregular. Sepals 4 to 5 connate in a spathaceous tube. Corolla 2-lipped, lower lip 3-lobed, tube curved. Stamens 4, didynamous on corolla-tube; anther cells spurred. Ovary 1-celled; ovules numerous; style long, tip curved; stigma bilobed. Capsule 1-celled, 2-valved (*Prain, Journ. As. Soc. Beng.* lxxiv. extra number, 364). Species 160, whole world.

Calyx spathaceous split to base; corolla campanulate . 1. *ÆGINETIA*
Calyx tubular 2- to 5-lobed; corolla funnel-shaped . 2. *CHRISTISONIA*

1. *ÆGINETIA*, Linn.

Parasites with simple (or branched) stems, naked or scaly. Flowers few large solitary or corymbose. Calyx spathaceous split in front nearly to base. Corolla curved campanulate tubular, limb 2-lipped, upper lobes connate. Stamens 4, included didynamous; anthers 1-celled; lower pair spurred. Ovary 1-celled; style slender; stigma large peltate. Capsule partly bivalved. Seeds many minute. Species 3, Indo-Malaya, China.

(1) *Æ. pedunculata* Wall. *Pl. As. Rar.* iii. 13, t. 219; *Prain, l.c.* 365. (Fig. 120, p. 489.)

Stems red or yellow, 3 to 6 in. tall; scapes several. Flowers several, on peduncles 1 to 4 in. long. Bracts ovate blunt. Calyx 1.5 to 2 in. long, pink at length white. Corolla 3 in. long, mouth 2 in. wide, yellow or white, lobes violet or claret colour crenate and erose. Capsule ovoid. *Hab.* Forests, rare. Perak, Batang Padang valley at 2000 ft. altitude (Wray). *Distrib.* India, Cambodia, Java, Sumatra, Borneo.

2. CHRISTISONIA, Gardn.

Dwarf parasitic fleshy herbs; stems tufted on a root stock. Flowers corymbose white (yellow or purple). Calyx tubular, 2- to 5-lobed. Corolla long inflated, curved, 5-lobed. Stamens 4; anthers 1-celled, 1 pair sometimes spurred. Style long; stigma large bilobed. Capsule ovoid or globose loculicidal. Species 12, tropical Asia.

FIG. 120.—*Aeginetia pedunculata*.

(1) *C. Scortechinii* Prain, *Journ. As. Soc. Beng.* lxxiii. (2), 205; lxxiv. 366.

Whole plant about 6 in. tall buried in the ground with only the flowers showing, fleshy, white. Flowers 3 to 8, crowded in a corymb, pedicelled and sessile. Calyx spathaceous splitting into 2 to 4 lobes, tube 1 in. long, lobes 25 in. long. Corolla-tube white with a yellow central bar 2 in. long, funnel-shaped, lower part 1 in. long, narrow cylindric, upper lip 2-lobed, lower 3-lobed. Stamens didynamous, all anthers connivent. *Hab.* In dense dark forests, rare. Perak (*Scortechinii*); Batang Padang valley under bamboos (*Ridley*).

ORDER CII. LENTIBULARIACEÆ.

Aquatic or marsh plants or often on wet rocks. Leaves rosulate linear, spathulate or orbicular, small or when submerged capillary multifid. Flowers irregular bisexual on a scape simple or branched; bracts small. Calyx inferior, 2- to 5-lobed. Corolla 2-lipped and spurred, upper lip smaller, lower entire to 6-lobed. Stamens 2, adnate to base of corolla; filaments wide curved; anther-cells ovate confluent. Ovary 1-celled, superior globose; ovules on free basal placenta; style short; stigma unequally bilobed. Fruit a globose capsule. Seeds very many. Species 200, whole world.

1. *UTRICULARIA*, Linn.

Leaves in submerged species multifid with minute bladders, in terrestrial species linear-spathulate or orbicular, bladders on fine threads under ground. Scapes racemose. Calyx bilobed often accrescent. Corolla small in Asiatic species, lower lip larger than upper. Species 150, whole world.

Aquatic plants; leaves divided into capillary segments with bladders.

Flowers yellow, plant free floating.

Peduncles stout; pedicels reflexed in fruit; flowers .35 to .5 in. across

(1) *U. flexuosa*

Peduncles slender; pedicels spreading; flowers .25 in. across

(2) *U. exoleta*

Flowers white, 1 in. across; stems 6 ft. long; fixed in mud

(3) *U. fluitans*

Flowers blue, free floating

(4) *U. punctata*

Terrestrial plants; leaves linear-spathulate.

Scales of scape not prolonged below base.

Stems short erect.

Flowers yellow several; stem slender, 2 to 6 in. tall

(5) *U. bifida*

Flowers yellow 1 or 2; stem stout, 1 in. long, lip semi-orbicular, .25 in. across

(6) *U. vitellina*

Flowers blue, scape 12 to 13 in. tall, lower lip entire

(7) *U. Griffithii*

Flowers mauve minute, scape 2 to 3 in. tall

(8) *U. minutissima*

Flowers violet, scape 3 in. long, lip 3-lobed

(9) *U. nigricaulis*

Stems twining; flowers yellow.

Very slender; flower .25 in. across

(10) *U. Wallichiana*

Rather stout; flower .5 in. across

(11) *U. involvens*

Scales and bracts produced below the point of attachment.

Flowers pedicelled yellow; capsule longer than sepals

(12) *U. verticillata*

Flowers sub-sessile small, white

(13) *U. albina*

Flowers few on stiff scapes, dark pink, larger

(14) *U. ophirensis*

Leaves orbicular or obovate; flowers violet with yellow centre, lower lip 4-lobed

(15) *U. striatula*

(1) *U. flexuosa* Vahl. *Enum.* i. 198; *Prain, Journ. As. Soc. Beng.* xxxiv. 368.

Floating with long masses of capillary leaves bearing minute bladders, 6 in. or more long. Scapes 3 to 10 in. long. Flowers 3 to 6 distant orange yellow; pedicels rather thick decurved in fruit. Calyx-lobes oval, sub-acute spreading in fruit, .25 in. long. Corolla .5 in. across, spur stout curved blunt. Capsule sub-globose, .25 in. long. *Hab.* Common in ponds and ditches. Singapore, Reservoir (Hullett); Changi Road; Jurong. Pahang, Kwala Pahang. Malacca, Tanjong Kling; Selandor. Perak, Telok Anson (Kunstler). Province Wellesley, Permatang Bertam. Lankawi, paddy fields (Curtis). Perlis, Kanga. Kelantan, Kota Bharu. *Distrib.* India, Cambodia, Java, Borneo, Australia. *Native names*: Lumut Ekor Kuching; Lumut Ekor Kuning.

var. *gracilis* Oliv. *Journ. Linn. Soc.* iii. 175. *U. inæqualis* Benj. *Linnæa* xx. 304.

This form seems to me merely a weak state, but it is said to have pale yellow flowers. It occurs in Singapore, Malacca, Perak and Province Wellesley with the large dark-coloured form; it is possibly a hybrid between this and the next species.

(2) *U. exoleta* R. Br. *Prodr.* 430; *Prain, l.c.* 368.

Floating plant with very slender capillary leaves with bladders. Stems slender, 3 to 4 in. tall with few 2 to 6 distant yellow flowers; pedicels .2 to .5 in. long, slender erect. Calyx 2-lobed, lobes ovate blunt. Corolla .2 in. across, spur cylindric conic. Capsule globose, .15 in. across. *Hab.* Ponds and ditches, common. Singapore, Garden Lake, Ang Mo Kio; Johor, Parit Lambong Muar. Pahang, Kwala Pahang. Perak, Sungei Rayah (Kunstler). Province Wellesley, Bukit Juru (Ridley). Tringganu (Yapp). *Distrib.* Indo-Malaya, Australia.

(3) *U. fluitans* Ridl. *Journ. Roy. As. Soc. S. Br.* 61, p. 32.

Stems slender 6 ft. or more long, base nude, above with slender branches bearing bladders, 4 to 5 in. long, terminal branches finely cut with dichotomous flexuous branches. Raceme 3 in. long. Flowers few, white on slender pedicels .25 in. long. Sepals ovate, .1 in. long. Corolla 1 in. across, upper lobes reniform or ovate, .25 in. long, lower ones transversely elliptic, white with a yellow spot, spur conic blunt, .25 in. long. *Hab.* In rivers, very local. Johor, Kota Tinggi, abundant but very rarely flowering, attached to mud at the bottom of the river (Ridley).

(4) *U. punctata* Wall. *Cat.* 2121; *Prain, l.c.* 369.

Floating weed with capillary divided leaves with small bladders. Scapes 4 to 12 in. tall with several bright blue flowers; pedicels slender, .5 to .6 in. long in fruit. Bracts ovate. Calyx bilobed, lobes round blunt, .1 in. long. Corolla .25 in. across, spur shorter than lower lip thick cylindric blunt. Capsule ovate-oblong, .2 in. long. Seeds winged, wing toothed. *Hab.* In backwaters, rare.

Pahang, Chenei Lake, Pahang River (Fox). *Distrib.* Tenasserim, Borneo.

(5) *U. bifida* Linn. *Sp. Pl.* 26; *Prain, l.c.* 370; *Bot. Mag. t.* 6689.

Terrestrial. Leaves linear-spathulate, .3 to .5 in. long. Scapes 2 to 6 in. tall with several distant flowers; pedicels .12 in. long. Flower .2 in. long in fruit. Calyx bilobed, lobes sub-equal, .15 in. long. Corolla .25 in. across, yellow with elevate orange spot on lip, spur conic-cylindric longer than pedicel, not curved. Capsule ovate. Seeds oblong covered with pustules. *Hab.* Common in damp sandy spots, rice fields and marshes. Singapore, Reservoir; Chan Chu Kang; Bukit Timah. Malacca, Ayer Panas (Griffith, Hervey); Bukit Sabukor. Selangor, Ulu Selangor. Dindings, Lumut. Perak, Temengoh. Penang (Curtis). Lankawi (Fox). Kelantan, Kota Bharu. Tringganu (Yapp). *Distrib.* India, China.

(6) *U. vitellina* Ridl. *U. aurea* Ridl. *Journ. F.M.S. Mus.* vi. 165 (not of Loureiro).

Leaves linear-lorate blunt, .12 in. long. Scape 1 to 1.5 in. tall, rather thick, purple. Scale-leaves 2 to 3 linear-oblong blunt. Flowers 1 or 2 together, .5 in. long from tip of spur to end of lip. Bracts lanceolate-ovate, purple or yellow. Sepals, upper oblong blunt, lower ovate blunt yellow. Corolla, upper lip ovate-oblong obtuse, yellow with brown streaks, lower lip semi-orbicular, .25 in. across, truncate obscurely 3-lobed at tip, yellow with 3 brown streaks; spur thick horn-shaped, curved yellow, .24 in. long. *Hab.* On peaty stream-banks in moss. Pahang, Gunong Tahan at 5000 ft. altitude (Ridley).

(7) *U. Griffithii* Wight, *l.c. Pl.* 1576. *U. affinis* var. *Griffithii* Oliv. *Journ. Linn. Soc.* iii. 179; *Prain, l.c.* 370.

Slender herb 12 to 15 in. tall. Leaves linear or linear-spathulate, .5 to .7 in. long. Scapes many flowered, flowers distant, 16 in. or more long; pedicels .15 in. long, in fruit erect. Calyx bilobed, lobes sub-equal ovate or orbicular, .25 in. long. Corolla bright purplish blue, .25 in. across, spur longer than pedicel. Capsule ovate, .2 in. long, enclosed in the large ovate calyx. Seeds reticulate. *Hab.* Local in shallow water. Singapore, Changi; Bedok; Tampinis; Serangoon (Murton). Malacca, Bukit Sabukor; Gunong Mering (Ridley). *Distrib.* Burma, China, Borneo.

(8) *U. minutissima* Vahl, *Enum.* i. 204; *Prain, l.c.* 371.

A minute capillary plant 2 to 4 in. tall. Bracts ovate-lanceolate decurrent below. Flowers minute very shortly pedicelled, about 10. Calyx-lobes ovate-round. Corolla bright mauve, upper lip round, lower narrow blunt, spur straight, twice as long. Capsule minute globose. Seeds scrobiculate. *Hab.* Damp spots in rice fields and up to 3000 ft. altitude. Pahang, Kwala Pahang; Rumpin River. Malacca, Ayer Panas; Mt. Ophir at 3000 ft. altitude. Perak, Larut (Kunstler).

First described by Vahl from specimens collected by Koenig in Malacca. He gives the colour of the flowers as blue, but I have little doubt that this tiny plant is what he intended. It is generally glabrous, but occasionally has a few black stiff hairs on the stem. Its minute size makes it difficult to find.

(9) **U. nigricaulis** *Ridl. Journ. Linn. Soc.* xxxviii. 317; *Journ. F.M.S. Mus.* vi. 164.

Leaves narrow linear blunt. Scape filiform, 3 in. tall, purple or green; scales lanceolate not prolonged below. Flowers small, few. Sepals unequal, upper blunt rounded, violet, lower much smaller greenish. Corolla, upper lobe oblong blunt whitish, base violet, lower lip 3-lobed, lobes sub-equal, middle one a little smaller, violet, base darker; spur horizontal, base gibbous little longer than lip, violet. Capsule ovate-orbicular. *Hab.* Damp peaty banks at 5000 to 6000 ft. altitude. Pahang, Gunong Tahan (Ridley). Kedah Peak (Robinson).

(10) **U. Wallichiana** *Wight, Ic. Pl. t.* 1572, fig. 1; *Prain, l.c.* 371.

Twining slender herb 6 to 8 in. long. Leaves linear-spathulate. Flowers small racemose; pedicels 0 to .25 in. long. Bracts lanceolate acute. Calyx-lobes ovate acute, .15 to .2 in. wide in fruit. Corolla, upper lip obovate, lower lip round, .2 in. wide, lemon yellow; spur straight or curved, .2 in. long. Capsule sub-globose. Seed ellipsoid scrobiculate. *Hab.* In damp spots twining on grasses, very local. Malacca, Mt. Ophir 4000 ft. altitude (Ridley). *Distrib.* India.

(11) **U. involvens** *Ridl. Journ. Bot.* xxxiii. 11; *Prain, l.c.* 372. (Fig. 121, p. 494.)

Plant forming a tufted mat of linear-spathulate leaves over 1 in. long. Stems twining about 1 ft. tall. Bracts lanceolate acute. Pedicels .5 to .75 in. long. Calyx-lobes oblong-ovate, nearly .25 in. long. Corolla bright lemon yellow, upper lip obovate, lower round bilobed, .35 in. wide, spur straight deflexed acuminate, .25 in. long. *Hab.* Rare, in damp grassy spots at 4000 ft. altitude, the stems twining on grass. Kedah Peak (Lobb, Ridley).

(12) **U. verticillata** *Benj. Linnæa* xx. 312; *Prain, l.c.* 372.

Leaves unknown. Stems erect 3 to 10 in. long, scales ovate prolonged downwards; pedicels puberulous, .2 in. long in flower, .25 in. long in fruit. Bracts and bracteoles produced below. Calyx 2-lobed, lobes orbicular, .1 in. long in fruit. Corolla yellow, .15 in. across, spur wide cylindric little longer than the lower lip. Capsule globose, .15 in. through. Seeds hexagonally reticulate. *Hab.* In wet spots open country, not common. Malacca (Griffith). Pahang, Kwala Pahang (Ridley). Lankawi (Curtis).

(13) **U. albina** *Ridl. U. albiflora* *Griff. Notulæ*, iv. 168 (not of Brown). *U. racemosa* var. *filicaulis* *Prain, l.c.* 373 (not of Clarke).

Slender herb about 3 to 6 in. tall, often branched. Leaves linear-spathulate. Scales produced below, ovate. Flowers about

6 or more crowded towards the top. Bracts and bracteoles ovate-lanceolate produced below. Calyx-lobes sub-equal yellowish. Corolla white, upper lip blunt lanceolate, lower broad obscurely bilobed blunt, terminal lobe ovate with an orange spot at base, spur horn-shaped horizontal little longer than lip. Capsule globose. Seeds scrobiculate. *Hab.* In sandy grassy spots and rice fields, rather common. Singapore, Changi; Reservoir; Telok Kurau.



FIG. 121.
Utricularia involvens.

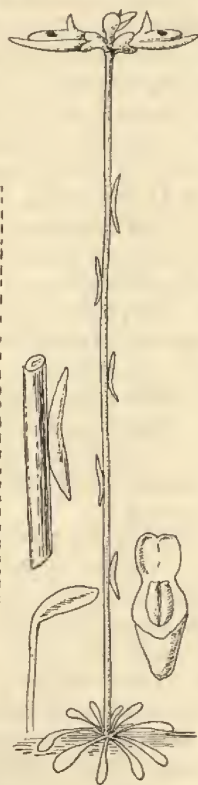


FIG. 122.
Utricularia ophirensis.

Pahang, Kwala Pahang. Malacca, Ayer Panas (Griffith); Bukit Sabukor. Selangor, Salak South (Seimund). Penang, Waterfall. Tringganu (Yapp). Setul heath. *Distrib.* Ceylon.

This has been confused with *U. racemosa*, a blue-flowered more robust plant, but it is much more slender, with smaller always white flowers, looking like a minute lily of the valley. These delicate plants do not dry well, whence much confusion has resulted. I have little doubt that this is Griffith's *U. albiflora* from Mergui, though he says that is few-flowered.

(14) *U. ophirensis* Ridl. *Journ. Bot.* xxxiii. 10. (Fig. 122, p. 494.)

Erect unbranched herb. Leaves linear-spathulate, .25 in. long. Scape rather stout, 8 in. tall. Bracts acute at both ends, produced below. Flowers few crowded at tip, 4 or 5 sub-sessile. Calyx-lobes orbicular blunt. Corolla .25 in. long, rose pink with darker streaks in the throat, upper lip short blunt, lower oblong blunt, spur horizontal longer than lower lip. Capsule globose, .1 in. long. Seeds oblong angled pustular. *Hab.* Mountain streams. Malacca, Mt. Ophir (Ridley). Kedah Peak (Robinson).

(15) *U. striatula* Rees, *Cyclop.* xxxvii. 17. *U. orbiculata* Wall. *Cat.* 1500; *Prain, l.c.* 374. *U. anthropophora* Ridl. *Journ. F.M.S. Mus.* vi, 165.

Leaves orbicular stalked, .15 in. across or less. Scapes slender, 2 to 5 in. long, 2- to 4-flowered, scales produced at base; pedicels .15 in. long. Calyx bilobed, lower lobe much smaller than upper, .12 in. across in fruit. Corolla violet (or white) with yellow spot on lower lip, 5-lobed; spur linear sub-acute, .2 in. long. Capsule globose, .1 in. across covered by upper calyx-lobe, longer than lower one. Seeds obovoid glochidiate. *Hab.* On dripping rocks, seldom in flower. Form of lip variable. Malacca, Mt. Ophir 4000 ft. altitude. Pahang, Gunong Tahan (Robinson). Perak, Gunong Bubu (Wray), flowers violet; Gunong Mas (Wray), flowers white. Lankawi, Telaya Tujon (Curtis). Kedah Peak (Robinson). *Distrib.* Africa, Indo-Malaya.

ORDER CIII. GESNERACEÆ.

Herbs or shrubs. Leaves opposite or by suppression of 1 of a pair alternate. Inflorescence axillary or pseudo-terminal cymose, racemose or paniced. Sepals 5, often more or less connate. Corolla tubular or campanulate, usually distinctly 2-lipped, 5-lobed. Stamens 4, didynamous, or 2 fertile only; filaments in long tubular corollas linear filiform, in short-tubed flowers short and thick; anthers linear or sub-globose, connivent in pairs, cells splitting on inner face. Ovary oblong; style slender simple. Stigma capitate or bilobed. Fruit a capsule oblong-linear, conic or fusiform splitting dorsally, or ovoid or a fleshy berry (*Cyrtandra*). Seeds minute, plumed in *Aeschynanthus* and *Agalmyla*, elliptic not plumed in all others. *Distrib.* Species about 600. All tropical except a few ranging into temperate regions. (Ridley, *Journ. Roy. As. Soc. S. Br.* 43, p. 1; *Journ. As. Soc. Beng.* lxxiv. 730.)

Fruit capsular elongate.

Seeds plumed. Epiphytic plants; leaves fleshy; flowers red or green.

Stamens 4 perfect; shrubby erect or creeping.
Stamens 2 perfect; scandent

1. *ÆSCHYANTHUS*
2. *AGALMYLA*

- Seeds not plumed. Terrestrial herbs; flowers blue, white, yellow or red.
- Corolla trumpet-shaped; stamens long filiform.
- Stamens perfect, 4 3. DIDISSANDRA
- Stamens perfect, 2.
- Stigma entire 4. DIDYMOCARPUS
- Stigma bifid 5. CHIRITA
- Corolla campanulate, tube short; filaments short, thick sinuate.
- Stamens 2; fruit conic 6. LOXOCARPUS
- Stamens 2; fruit cylindric straight.
- Corolla-lobes rounded broad 7. PARABŒA
- Corolla gibbous, lobes tooth-like 8. CODONOBŒA
- Capsule twisted.*
- Calyx 5-lobed; stamens 2 9. BŒA
- Calyx 3-lobed; stamens 2 10. DICHIOBŒA
- Stamens 4, complete 11. BŒICA
- Capsule ovoid or ellipsoid, hardly longer than sepals.*
- Stamens 2.
- Stem short; sepals linear free 12. ORCHADOCARPA
- Stem tall; sepals ovate free 13. LEPADANTHUS
- Stem tall; calyx campanulate connate half way 14. RHYNCHOGLOSSUM
- Stamens 4.
- Herbs.
- Fruit circumscissile 15. EPITHEMA
- Fruit splitting irregularly; leaves 2 (cotyledons) one very small, one large 16. MONOPHYLLŒA
- Fruit splitting irregularly; leaves several, in unequal pairs.
- Flowers large campanulate; stamens not exsert 17. STAURANTHERA
- Flowers small, tube short; stamens exsert. 18. LOXONIA
- Shrubs.
- Sepals free to base; flowers small 19. RHYNCHOTECUM
- Sepals connate in a tube, red; flowers large 20. CYTANDROMŒA
- Fruit fleshy baccate*; shrubs; stamens 2 21. CYRTANDRA

1. ÆSCHYNANTHUS, Jack.

Shrubs, epiphytes or rock-plants generally erect with many slender branches. Leaves opposite or whorled, fleshy or coriaceous lanceolate or ovate. Flowers usually showy, scarlet, yellow or green in axillary or terminal heads. Calyx tubular or campanulate or sepals free to base. Corolla tubular, curved, dilate above, shortly 2-lipped, upper lobe erect; lower 3-lobed deflexed. Stamens 4, didynamous exsert; anthers connivent in pairs. Ovary superior. Disk cup-shaped. Style long; stigma small peltate. Capsule cylindric slender long, 2-valved, base often empty and narrower (gynophore). Seeds very many, minute with 1 hair at top, 1 or many at bottom. Species about 60, Indo-Malaya, China.

Seeds with a plume at one end, one hair at the other. Sepals free; flowers light green with purple bars.

Sepals as long as corolla; leaves pink beneath; corolla 1 in. long

(1) *Æ. purpurascens*

Sepals as long as corolla; leaves green beneath; corolla 5 in. long

(2) *Æ. breviflora*

Sepals shorter than corolla; leaves marbled beneath; corolla 1 in. long

(3) *Æ. marmorata*

Seeds with 1 hair at each end.

Sepals free nearly to base.

Leaves whorled very narrow, upper ones linear

(4) *Æ. stenophylla*

Leaves whorled large lanceolate; flowers 3 in. long

(5) *Æ. speciosa*

Leaves opposite; flowers red.

Corolla 2 to 3 in. long; sepals pubescent

(6) *Æ. longiflora*

Corolla 2 to 3 in. long; sepals glabrous

(7) *Æ. perakensis*

Corolla under 1 in. long; dwarf plant

(8) *Æ. Hildebrandtii*

Sepals connate in a tube, lobed.

Erect shrubs.

Calyx purple with short lobes

(9) *Æ. rhododendron*

Calyx red with long lanceolate-acuminate lobes

(10) *Æ. longicalyx*

Stems creeping and rooting.

Leaves glabrous

(11) *Æ. parvifolia*

Leaves pubescent

(12) *Æ. radicans*

Calyx cup-shaped green

(13) *Æ. Wallichii*

Calyx obconic red

(14) *Æ. obconica*

(1) *Æ. purpurascens* Hassk. *Cat. Hort. Bogor. alter* 154; *Bot. Mag. t.* 4236. *Æ. Motleyi* Clarke in *DC. Monog. Phan.* v. 120; *Ridl. Journ. As. Soc. Beng.* lxxiv. (2), 730.

Slender erect epiphyte. Leaves fleshy, lanceolate or ovate acute, dull green above, pink beneath, 3 to 4 in. long, 5 to 1.5 in. wide; petioles .25 in. long. Flowers 1 or few; pedicels .25 in. long. Calyx 1.76 to 1 in. long, glabrous, blackish red. Corolla .75 to 1.25 in. long, tube light green, lobes round sparsely hairy, tipped purple brown. Stamens brown. Capsule cylindric, 9 to 13 in. long. Seeds tufted at one end, one hair at the other. *Hab.* Woods on trees and branches; not rare. Singapore, Chan Chu Kang. Johor, Batu Pahat. Pahang River. Selangor, Ginting Sempah. Perak, Thaiping Hills; Kurau; Batang Padang (Wray); Goping (Kunstler). Kelantan, Kwala Aring (Yapp). *Distrib.* Sumatra, Borneo, Celebes, Ceram, Java.

(2) *Æ. breviflora* Ridl. *Æ. parviflora* Ridl. *Journ. F.M.S. Mus.* iv. 48 (*not of Sprengel*).

Tufted epiphyte over 1 ft. tall. Leaves narrow lanceolate acuminate, 3 in. long, 5 in. wide; petioles .12 in. long. Flowers solitary; pedicels .12 in. long. Sepals free to base linear acuminate, glabrous, 5 in. long. Corolla greenish yellow, hardly .5 in. long, tube narrow cylindric, lobes oblong round ciliate. Stamens included. Capsule 4 to 5 in. long. Seed a tuft at one end, one

hair at the other. *Hab.* River banks, rare. Pahang, Telom, on a tree over the river (Ridley).

(3) *Æ. marmorata* T. Moore in *Pact. Fl. Gard.* iii. 56; Ridley, *l.c.* 732.

Similar to the last in habit. Leaves lanceolate-acute marbled with purple bars beneath, 2 to 3 in. long, .5 to 1 in. across. Flowers few, axillary; pedicels .25 in. long. Calyx-lobes pubescent, .35 to .4 in. long, tube very short. Corolla 1 in. long, curved, lobes pubescent, green with brown bars in mouth. Filaments hairy long-exsert. Capsule 6 in. long. Seeds plumed at one end. *Hab.* Perak, Ulu Temengoh. Penang Hill (Curtis). Lankawi islands, Gunong Raya (Curtis). *Distrib.* Burma, Siam.

(4) *Æ. stenophylla* Ridl., *l.c.* 733; *Journ. Roy. As. Soc. S. Br.* 61, p. 33.

Stems slender, 1.5 ft. long. Leaves, lower elliptic fleshy, blunt, 1 in. long, .25 in. across, upper linear, 2 in. long, .12 in. wide. Flowers solitary, terminal and axillary; pedicels .12 in. long. Sepals linear acuminate, .06 in. long. Corolla .75 in. long, slender straight, cream yellow edged purple. Stamens not exsert. Style short, .25 in. long, purple; ovary longer, green. Capsule linear cylindric, 1 ft. long. Seeds with 1 hair at each end, .75 in. long. *Hab.* Rare. Apparently self-fertilised, as the flowers hardly open. Johor, Sedenah (Ridley). Perak, Goping (Kunstler).

(5) *Æ. speciosa* Hook. *Bot. Mag. t.* 2320; Ridl., *l.c.* 733.

A stout shrubby plant about 1 ft. tall. Leaves fleshy, whorled 4 to 5, lanceolate acute edge undulate, 3 to 6 in. long, .75 to 1.75 in. long; petioles .125 to .25 in. long. Flowers clustered, sub-terminal, 10 or more together; bracts linear hairy; pedicels .5 in. long. Sepals free to base pubescent, .5 in. long. Corolla 3 in. long, curved cylindric, dilate upwards. Stamens longer. *Hab.* Not very common in hill forests. A very handsome plant. Selangor, Bukit Hitam (Kelsall). Perak, Bruseh, near Bidor (Napier); Ulu Selama (Yapp). Tomoh (Machado). *Distrib.* Java, Borneo.

(6) *Æ. longiflora* DC. *Prodr.* ix. 262; Ridl., *l.c.* 734.; *Bot. Mag. t.* 4328.

Erect woody over 1 ft. tall. Leaves in distant pairs fleshy lanceolate or ovate acuminate, 5 in. long, 2 in. wide; petioles .5 in. long. Flowers several, terminal; pedicels hairy, .5 in. long. Sepals narrow, .5 in. long, free nearly to base, puberulous. Corolla 3 in. long, cylindric curved and dilate at top, hairy, bright red, lobes short, round. Stamens .75 in. longer than corolla-tube. Capsule over 6 in. long. *Hab.* Rare in forests. Pahang, Tahan River (Ridley). *Distrib.* Java.

The flowers are a little smaller and leaves narrower than in the Java form.

(7) *Æ. perakensis* Ridl. *Journ. Linn. Soc.* xxxii. 449.

Shrubby plant 2 ft. tall. Leaves coriaceous lanceolate-acumin-

ate, 3 to 7 in. long, 1 to 2 in. wide. Flowers in terminal fascicles; pedicels .5 in. long. Sepals .25 in. long, linear, free to base, glabrous. Corolla deep red, 2 to 3 in. long, cylindric dilate upwards and curved, lobes round. Stamens long, exsert. Capsule over 1 ft. long. Seed with one hair at each end. *Hab.* Mountain forests, Perak, Thaiping Hills up to 4000 ft. altitude (all collectors); Gunong Kerbau (Robinson); Sungei Rayah (Kunstler); Gunong Berumbun, Telom (Ridley).

(8) *Æ. Hildebrandtii* Hemsl. *Bot. Mag. t.* 7365; *Ridl. Journ. As. Soc. Beng., l.c.* 734.

Dwarf epiphyte 6 in. tall to 2 ft. long, creeping. Leaves fleshy sessile ovate acute, base round, edge ciliate-glandular, .5 in. long and wide. Flowers few, terminal; pedicels .25 in. long. Sepals free, linear pubescent, .15 to .2 in. long. Corolla-tube thick curved, .75 in. long, orange; lobes round pubescent red. Stamens shortly exsert. Capsule 6 in. long, base narrow. *Hab.* Mountain forests at 4000 to 5000 ft. altitude, high up on trees, Pahang, Gunong Benom, Kluang Terbang (Barnes). Perak, Thaiping Hills at 5500 ft. altitude (Ridley). *Distrib.* Burma.

(9) *Æ. rhododendron* Ridl. *Journ. Linn. Soc. xxxii.* 500; *Journ. As. Soc. Beng., l.c.* 735.

Erect shrub 1 to 2 ft. tall, stout. Leaves fleshy-coriaceous ovate acuminate, 2 in. long, 1.5 in. wide. Flowers fascicled axillary and terminal. Calyx tubular, deep purple, 1 in. long, lobes short acute. Corolla 3 in. long, dilate above, glabrous, lobes oblong, .5 in. long, round, deep red with 3 black streaks on the lower lobes. Stamens very shortly exsert. Capsule cylindric, stout, 4 in. long, narrowed at base. Seeds one-haired at each end. *Hab.* Mountain forests, Perak, Thaiping Hills at 2500 to 6000 ft. altitude (all collectors); Plus River (Scortechini).

(10) *Æ. longicalyx* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 16; *Journ. As. Soc. Beng., l.c.* 735.

Stem woody over 1 ft. tall. Leaves fleshy, ovate acuminate, 2 to 3 in. long, 1 to 1.5 in. wide. Flowers several, terminal; pedicels .5 in. long. Calyx tubular, thick, 1.25 in. long, lobes lanceolate acuminate, .5 in. long, glabrous, bright red. Corolla 3 in. long, glabrous except the pubescent mouth, lobes large oblong-rounded, over .5 in. long and .25 in. wide in var. Stamens shorter than corolla-lobes. Capsule 7 in. long, valves .25 in. wide, linear splitting for 5 in. *Hab.* Mountain forests, Pahang, Gunong Berumbun, Telom. Selangor, Menuang Gasing (Kloss); Semangkok Pass. Gunong Mengkuang Lebah (Robinson), the var. *superba* with bigger corolla and wider calyx-lobes. Perak, Gunong Kerbau at 5500 ft. altitude (Robinson); Gunong Batu Putih (Wray); Gunong Inas (Yapp).

This is very variable locally in size of flowers and width of calyx-lobes. It is a beautiful plant, easily known by its large bright red calyx.

(11) *Æ. parvifolia* R. Br. in Benn. Pl. Jav. Rar. 115. *Æ. Lobbiana* Clarke, DC. Mon. Phan. v. 44; Ridl. Journ. As. Soc. Beng., l.c. 735 (not of Hooker).

Creeping epiphyte on trees. Leaves coriaceous, ovate-lanceolate or lanceolate, 1·5 to 2 in. long, ·25 to ·75 in. wide, glabrous, blunt at both ends; petioles very short. Flowers in terminal fascicles of 3 to 5; pedicels ·75 in. long. Calyx tubular, 1 in. long, pubescent, dark purple. Corolla-tube 2 in. long, curved, pubescent, deep red. Stamens hardly exsert. Capsule 13 in. long on a gynophore. Seed pustular with one white hair at each end. *Hab.* Common in forests. Leaves thin lanceolate or fleshy and more ovate according to locality, Singapore, Sungei Tengah and Krangi in mangroves. Johor, Batu Pahat; Gunong Pulai (King); Jambu Larang (Feilding). Malacca, Mt. Ophir; Ayer Panas. Pahang, Pekan; Kwantan (Durnford). Selangor, Semangkok Pass. Perak, Thaiping Hills; Gunong Kerbau (Robinson). Penang Hill (Curtis). Lankawi, Gunong Raya (Curtis). Kedah Peak. *Distrib.* Sumatra, Borneo, Bangka.

(12) *Æ. radicans* Jack, Trans. Linn. xiv. 43; Ridl. Journ. As. Soc. Beng., l.c. 73.

Creeping on rocks and tree trunks several feet long. Leaves fleshy ovate blunt, base broad, hairy, ·5 to 1·25 in. long, ·5 to ·75 in. wide. Flowers axillary, 1 or 2 together; pedicels ·5 in. long. Calyx tubular, hairy, ·75 in. long, purple, lobes blunt or sub-acute. Corolla thick, cylindric, curved, hairy, bright red, lobes sub-acute. Stamens hardly exsert. Capsule cylindric, slender, 10 in. long. *Hab.* In woods and forests, common, Singapore, Bukit Timah. Malacca, Sungei Rambai (Derry). Sungei Ujong (Cantley). Pahang, Kuala Teku (Seimund). Perak, Bujong Malacca; Sungei Rayah (Scortechini); Temengoh; Changkat Mentri (Kloss). Tringganu, Bundi (Rostados).

var. *lanuginosa* Ridl., l.c. Calyx green, entirely white woolly as is corolla. Perak (Scortechini). *Distrib.* Sumatra, Java, Borneo.

(13) *Æ. Wallichii* R. Br. in Benn. Pl. Jav. Rar. 116; Ridl. Journ. As. Soc. Beng., l.c. 736.

Woody, slender, glabrous. Leaves lanceolate or elliptic acuminate, base narrowed, 3 in. long, 1 to 1·25 in. wide; petioles ·25 in. long. Flowers few, axillary; pedicels ·25 in. long. Calyx cup-shaped, green, ·25 in. long, hairy. Corolla dark red, ·75 to 1 in. long, tube stout, lobes large, rounded, hairy. Stamens included. Capsule 8 in. long. *Hab.* In dark woods widely scattered, Singapore (Wallich); Bukit Mandai; Kranji. Johor, Ulu Batu Pahat (Kelsall); Tanjong Kupang; Tebrau. Malacca, Mt. Ophir (Maingay). Perak, Tapah; Bujong Malacca (Curtis). *Distrib.* Sumatra, Borneo.

(14) *Æ. obconica* Clarke, DC. Mon. Phan. v. i. 50; Ridl. Journ. As. Soc. Beng., l.c. 737; Bot. Mag. t. 7336.

Climbing and rooting 2 to 3 ft. long. Leaves coriaceous, oblong

or elliptic-acuminate, base round or slightly narrowed, 1·5 to 3 in. long, '75 to 1·25 in. wide; petioles '25 in. long. Flowers few, clustered; pedicels hairy, '25 in. long. Calyx deep red, saucer-shaped, hairy, '25 in. long, entire. Corolla '5 in. long, tube thick and short, lobes hairy, deep red with yellowish white central bars. Stamens shortly exsert. *Hab.* Deep forests, Selangor, Klang (Beccari); Sungei Buluh. Dindings, Pangkor. Perak, Batu Kurau and Bujong Malacca (Curtis); Thaiping Hills; Tapah; Blanja and Relau Tujor (Wray); Sira Rimau, base of Gunong Inas (Yapp). *Distrib.* Borneo.

2. AGALMYLA, Blume.

Climbing epiphytic shrubs with pale bark. Leaves alternate, long-petioled, herbaceous ovate (or lanceolate). Flowers in dense axillary cymes, scarlet, large. Calyx deeply 5-lobed, lobes narrow acute. Corolla tubular ventricose above, 2-lipped, lobes 5, ovate. Stamens 2, perfect, exsert. Ovary linear; style long; stigma 2-lipped. Capsule linear, 2-valved. Seed with a hair at each end. Species 3 or 4, Java, Sumatra, Borneo.

(1) *A. staminea* Blume, *Bl. Bijdr.* 767; *Bot. Mag.* 5747; *Ridl. Journ. As. Soc., l.c.* 738.

Stems twining spirally round trees. Leaves elliptic-oblong narrowed both ends, strigose beneath, 8 to 12 in. long, 3 to 4 in. wide; petioles 6 to 8 in. long, hairy. Cymes sub-sessile. Sepals free nearly to base, '5 in. long. Corolla 1·25 to 1·5 in. long, pubescent scarlet. Stamens exsert for 1 inch. Capsule 14 in. long. *Hab.* Hill forests, a most beautiful plant, common where it grows, Selangor, Menuang Gasing (Kloss). Perak, Thaiping Hills to 3500 ft. altitude (all collectors); Gunong Kerbau (Robinson). *Distrib.* Java, Sumatra, Borneo.

3. DIDISSANDRA, Clarke.

Shrublets or herbs; stems tall or short. Leaves opposite or crowded in a rosette at the top of the stem. Flowers in short axillary cymes or on erect scapes solitary or few. Sepals free to base or nearly lanceolate or ovate. Corolla showy, blue, white, pink or yellow, narrow tubular, dilate upwards or funnel-shaped, 2-lipped. Stamens 4; filaments long, slender; anthers ovate connivent. Capsule cylindric, elongate, straight. Species about 20, Malay Peninsula and Sumatra.

Stems tall, internodes long; flowers in axillary clusters.

Leaves entire (1) *D. johorica*
Leaves crenulate (2) *D. frutescens*

Stems short woody bare below; leaves rosulate above.

Leaves hairy above serrate or dentate.

Capsule slender cylindric.

Sepals lanceolate acuminate.

Leaves simply serrate (3) *D. hirta*

Leaves doubly serrate (4) *D. serratifolia*

Sepals oblong ovate; corolla deep purple (5) *D. atrocyanea*

Sepals linear acuminate serrate, 5 in. long (6) *D. longisepala*

Capsule short, thick fusiform; sepals broad (7) *D. latisejala*

Leaves glabrous above.

Edges entire sinuate or obscurely crenulate.

Corolla orange (8) *D. flammea*

Corolla violet purple, slender, funnel-shaped (9) *D. violacea*

Corolla violet purple, wide cylindric (10) *D. atropurpurea*

Corolla violet purple wide, funnel-shaped; petiole long hairy (11) *D. petiolata*

Edges serrate or lobed.

Sepals glabrous.

Leaves dentate; corolla white marked violet (12) *D. Wrayi*

Leaves coarsely lobed runcinate; corolla yellow (13) *D. quercifolia*

Sepals pubescent.

Leaves coarsely serrate; sepals linear lanceolate.

Flowers solitary, 1.5 in. long (14) *D. glabrescens*

Flowers 3 at top of peduncle, .75 in. long (15) *D. castaneæfolia*

Leaves deeply lobed; sepals elliptic (16) *D. filicina*

(1) *D. johorica* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 22; *Journ. As. Soc. Beng., l.c.* 739.

Stems tall, 2 to 3 ft. tall, hairy. Leaves alternate below, opposite above, lanceolate acuminate, base long narrowed; edges entire; scabrid hairy beneath, 6 in. long, 1.25 in. wide. Cymes axillary; peduncles hairy, 1 in. long; flowers 3 or 4, pink. Sepals linear-lanceolate, hairy. Capsule slender cylindric, 1.5 in. long. *Hab.* Rare in dense forest, Johor, Gunong Pantai at 1000 ft. altitude (Ridley).

(2) *D. frutescens* Clarke, *DC. Mon. Phan., l.c.* v. i. 67, p. 17; *Ridl. Journ. As. Soc. Beng., l.c.* 740. *D. yunnanensis* Jack

Shrubby 3 to 4 ft. tall, close appressed hairy. Leaves opposite, elliptic-lanceolate acute, base cuneate, crenulate sparsely hairy above, tawny silky hairy beneath, 7 to 9 in. long, 3 to 4 in. wide; petioles 1.5 to 3 in. long, hairy. Cymes axillary, hairy, slender, 1 in. long. Flowers in pairs or threes. Sepals lanceolate red-hairy. Corolla funnel-shaped, white, lobes round. Capsule slender, 3 in. long, glabrous. *Hab.* Banks and damp ravines in forest. Malacca (Griffith). Dindings, Lumut. Perak, Tapah and Waterfall Hill, Thaiping (Wray); Kinta River (Kunstler); Pondok Tanjong (Burn-Murdoch). Penang Hill (Maingay, Curtis, etc.). *Distrib.* Sumatra.

(3) **D. hirta** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 28; *Journ. As. Soc. Beng.*, l.c. 740.

Stem woody, 3 in. long. Leaves rosulate oblanceolate oblique, serrate, with pale hairs scattered above and many on the leaves beneath, 4 to 9 in. long, 2 in. wide. Scape 3 to 4 in. long, hairy. Sepals .25 in. long, lanceolate acuminate, very hairy. Corolla 1 in. long, broad-cylindric, lobes .5 in. long, round, violet, centre darker. *Hab.* Dense forests, Perak, Bujong Malacca (Ridley).

(4) **D. serratifolia** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 25; *Journ. As. Soc. Beng.*, l.c. 740.

Stem woody, 4 to 5 in. tall, red-hairy above. Leaves oblanceolate acuminate, base long cuneate, edge doubly serrate sprinkled with multicellular hairs above and on nerves beneath, 6 to 10 in. long, 1.75 to 2.25 in. wide; petioles 1 in. long or less, hairy. Flower solitary on a slender hairy peduncle 4 in. long. Sepals lanceolate, acuminate, .25 in. long, densely red-hairy. Corolla 1.5 in. long, blue, tube dilated upwards sparsely hairy, lobes round. Capsule 1.5 in. long, rather thick. *Hab.* Dense forests. Perak, Bujong Malacca (Ridley).

(5) **D. atrocyanea** Ridl. *Journ. Roy. As. Soc. S. Br.* 43, p. 26; *Journ. As. Soc. Beng.*, l.c. 741.

Stem woody, 6 in. tall. Leaves oblong or lanceolate-oblong strongly serrate, above conic-pustular, with hairs on pustules, beneath punctate, densely red-hairy on nerves; 4 to 5 in. long, 1 to 2 in. wide; petioles winged to base. Flower 1 to 3 in. long; peduncles hairy. Sepals oblong-ovate, .125 in. long. Corolla nearly 2 in. long, black purple, mouth nearly black, tube cylindric pubescent, lobes short, round. Capsule 1 to 2 in. long, curved. *Hab.* Dense forests, Perak, Bujong Malacca (all collectors); Gunong Batu Putih (Wray).

(6) **D. longisepala** Ridl. *Journ. F.M.S. Mus.* iv. 49.

Stem hairy, 6 in. tall. Leaves petioled, elliptic acute, serrate sprinkled with hairs above, midrib and nerves hairy beneath, 5 in. long, 2 in. wide; petioles hairy, 3 in. long. Peduncles slender, hairy, 4 in. long. Sepals linear acuminate serrate with a hair on each tooth, .5 in. long, .1 in. wide. Corolla 2 in. long, gradually dilate upwards, violet, inside of tube paler. *Hab.* Dense forest at 4500 ft. altitude; very rare, Pahang, Cameron's Plateau, track to Gunong Irau (Kloss).

(7) **D. latisepala** Ridl. *Journ. Linn. Soc.* xxxii. 503; *Journ. As. Soc. Beng.*, l.c. 741.

Stem short, woody. Leaves oblong-lanceolate, edge crenate-dentate, sparsely red-hairy; nerves beneath densely hairy, 7 in. long, 2 in. broad; petioles 1 in. long. Flowers few, on a hispid peduncle 6 in. long. Sepals ovate, .125 in. long, glabrous. Corolla purple (?), 1 in. long; tube dilate upwards; lobes short, round. *Hab.* Legh (Machado). Very rare.

(8) ***D. flammea* Ridl.** *Journ. Linn. Soc.* xxxii. 503; *Journ. As. Soc. Beng.*, l.c. 742.

Stem 2 in. long, pubescent. Leaves oblong blunt, glabrous except nerves beneath, grey green, 4 in. long, 1·25 in. wide; petioles pubescent. Flowers few on a stout purple pubescent peduncle, 3 in. long. Sepals narrow lanceolate acuminate, green with purple hairs. Corolla-tube narrow at base, abruptly dilate hairy, orange with darker red round lobes. Capsule short, 1·5 in. long, purple. *Hab.* Legeh (Machado). Very rare.

(9) ***D. violacea* Ridl.** *Journ. Roy. As. Soc. S. Br.* 44, p. 23; *Journ. As. Soc. Beng.*, l.c. 742.

Stem woody, 6 in. tall. Leaves oblanceolate sub-falcate acuminate, base narrowed, edges sinuate, glabrous, nerves beneath red-hairy; 4 to 7 in. long, 1 to 2 in. wide. Peduncles numerous, 2 to 3 in. long, red-hairy, 1-flowered. Bracts linear-lanceolate, ·5 in. long or less. Sepals linear-lanceolate, glabrous, ·25 to ·5 in. long. Corolla violet, 1 to 1·5 in. long; tube rather narrow dilate upwards, pubescent, lower lip longer than upper one. Capsule 1·5 in. long, rather thick. *Hab.* Mountains at 6700 ft. altitude, rare. Perak, summit of Gunong Batu Putih (Wray).

(10) ***D. atropurpurea* Ridl.** *Journ. Linn. Soc.* xxxii. 504; *Journ. As. Soc. Beng.*, l.c. 742.

Stem woody, 2 in. long. Leaves lanceolate or obovate, base narrowed, obscurely crenulate, glabrous above, hairy on nerves beneath, 4 in. long, 1·5 in. wide; petioles 1 to 1·5 in. long. Flowers sub-sessile in pairs on glabrous purple peduncles 3 to 5 in. long. Bracts 2, ovate, ·25 to ·5 in. long, purple. Sepals lanceolate, acute, ·25 to ·35 in. long, glabrous. Corolla deep purple, base narrowed, widely dilate above, 2 in. long, ·5 in. across. Capsule thick, 2 in. long. *Hab.* Perak, Hermitage Hill; Gunong Inas (Scortechini).

(11) ***D. petiolata* Ridl.**

Stem woody. Leaves elliptic, very shortly acuminate blunt, base truncate, edge crenulate serrate, above glabrous, beneath whitish, sparsely brown hairy with long hairs on the nerves, 3·5 in. long, 2 in. wide; petioles 2 in. long, rather slender, long-hairy. Peduncles hairy, 6 in. or more long. Flowers distinct, 2 or 3. Sepals green, broad lanceolate acuminate, ·25 in. long, hairy. Corolla 1·25 in. long, base shortly narrowed, sparsely pubescent, tube wide, dilate upwards; limb 1 in. across; lobes rounded. *Hab.* Perak, Gunong Inas (Yapp).

This is near *D. violacea* and *D. latisejala*, but the sepals are broader lanceolate than in the first, and hairy. Some leaves are sparsely hairy above.

(12) ***D. Wrayi* Ridl.** *Journ. Roy. As. Soc. S. Br.* 44, p. 24; *Journ. As. Soc. Beng.*, l.c. 743.

Stem 3 to 4 in. tall or taller, woody. Leaves lanceolate oblique acuminate, narrowed into the petiole at the base, closely dentate,

glabrous above, paler beneath, nerves covered with red hairs, 4 to 6 in. long, 1·5 to 2 in. wide. Flowers solitary on slender hairy peduncles. Bracts ovate broad, glabrous, ·25 in. long. Sepals broad lanceolate blunt, glabrous, ·5 in. long, white. Corolla white, pencilled violet, 1·25 to 1·5 in. long, tube thick, lobes broad. Capsule 1·5 to 2 in. long, glabrous. *Hab.* Dense forests. Perak, Gunong Batu Putih (Wray). Pahang, Telom district, Cameron's Plateau (Ridley).

(13) *D. quercifolia* Ridl. in *Journ. Linn. Soc.* xxxiii. 504; *Journ. As. Soc. Beng., l.c.* 743.

Stem woody, 6 in. long or less. Leaves lanceolate or oblanceolate runcinate, base narrowed, dark green, glabrous above, glaucous with the nerves brown-hairy beneath, 4 to 8 in. long, 1 to 2 in. wide; petioles 1 in. long or less. Flowers 1 or 2 on peduncles sparsely hairy, ·6 in. long. Bracts broad lanceolate obtuse, green, glabrous. Corolla lemon-yellow, dilate cylindric, base narrow. Capsule 3 in. long. *Hab.* Banks in dense forest; very local. Perak, Thaiping Hills at 2400 to 3000 ft. altitude (all collectors); Bukit Rengas (Fox).

(14) *D. glabrescens* Ridl. in *Journ. Roy. As. Soc. S. Br.* 44, p. 24; *Journ. As. Soc. Beng., l.c.* 744.

Stem woody, 3 to 4 in. long. Leaves elliptic-lanceolate to oblanceolate, coarsely serrate, glabrous except the red-hairy nerves beneath, 4 to 7 in. long, 1 to 2·5 in. wide; petioles 1 in. long, hairy. Flowers solitary on hairy peduncles 4 to 5 in. long. Bracts lanceolate, oblong ·125 to ·25 in. long. Sepals linear-lanceolate blunt hairy, ·25 to ·5 in. long. Corolla mauve (Wray), deep blue (Kunstler), 1·5 in. long, tube gradually dilate upwards, lobes pubescent. Capsule 1·5 to 2·5 in. long, slender purple. *Hab.* Perak, Kinta, Gunong Megua (Kunstler); Gunong Batu Putih (Wray).

(15) *D. castaneæfolia* Ridl. *Journ. Roy. As. Soc. S. Br.* 86, p. 302.

Stem 3 in. tall. Leaves oblong to lanceolate, base narrowed minutely, unequally cordate at base, edge coarsely serrate, membranous glabrous above; nerves 15 pairs with midrib coarsely hairy beneath; 5·5 to 7 in. long, 1·75 to 2 in. wide; petioles 1·75 to 2 in. long, coarsely hairy. Peduncles 4 in. long, coarsely hairy. Flowers in a terminal cyme of 3. Bracts linear-oblong, ·12 in. long. Sepals lanceolate acuminate blunt, ·3 in. long, ·1 in. wide. Corolla ·75 in. long, sparsely short hairy, limb ·4 in. wide (when dry). *Hab.* Pahang, Kwala Teku (Seimund). On rocks.

(16) *D. filicina* Ridl. in *Journ. Roy. As. Soc. S. Br.* 44, p. 27; *Journ. As. Soc. Beng., l.c.* 744.

Stems 6 in. tall or more, woody. Leaves lanceolate or oblanceolate, deeply lobed with large ovate acute lobes about 13 on each side, glabrous except nerves, red-hairy beneath, 3 to 5 in. long, 1 to 1·5 in. wide; petioles ·5 in. long, red-hairy. Peduncles 1·5 to 3 in. long, hairy, bracts ·1 in. long, ovate. Flower solitary.

Sepals elliptic round, dark red-hairy, '1 to '2 in. long. Corolla trumpet-shaped, purple, inside dark purple with 6 white lines. 1'5 in. long, '75 in. across, lower lip distinctly longer than upper, Capsule sub-follicular, 1'5 in. long. *Hab.* Forests in mountains, Pahang, Telom (Ridley). Perak, Gunong Chabang (Scortechini); Gunong Kerbau (Robinson).

4. DIDYMOCARPUS, Wall.

Herbs or shrublets. Leaves usually pubescent and serrate, herbaceous, opposite or alternate ones reduced, ovate to lanceolate. Peduncles axillary with a cyme of one or more flowers, or terminal panicles. Calyx-lobes 5, free to base or nearly. Corolla funnel-shaped, limb bilabiate. Stamens complete 2; filaments filiform inserted half-way down tube. Staminodes 2, short, hooked. Ovary cylindric passing into a long style. Stigma capitate, entire. Capsule cylindric acuminate splitting along the upper edge. Seeds numerous, minute ellipsoid, not plumed. Species about 100, India and Malay islands, about half in the Malay Peninsula, rarer further east.

i. EUDIDYMOCARPUS. Flowers paniced terminal or axillary with conspicuous pairs of bracts at base of panicle branches and lanceolate sepals.

Woody shrubs; panicles axillary.

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| Bracts connate, cup-shaped; flower white personate | (1) <i>D. corchorifolia</i> |
| Bracts 2; leaves thick, woolly whorled | (2) <i>D. robusta</i> |
| Bracts 2; leaves oblique; flowers few, yellow | (3) <i>D. sulphurea</i> |
| Bracts 2; leaves thin, villous; panicle terminal flowers yellow, | (4) <i>D. citrina</i> |
| Herbaceous weak; panicle terminal; flowers claret colour | (5) <i>D. purpurea</i> |
| Rootstock short; leaves rosulate. | |
| Panicle terminal; flower violet, '5 in. long; leaves ovate not cordate | (6) <i>D. violacea</i> |
| Leaves oblong or ovate cordate; flowers 1 in. long, deep violet | (7) <i>D. lacunosa</i> |
| Leaves alternate distant, inæquilateral; flowers blue | (8) <i>D. inæqualis</i> |

ii. DIDYMANTHUS. Herbs with distant pairs of leaves; flowers cymose axillary usually on long peduncles; bracts very inconspicuous.

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|---|----------------------------|
| Flowers very small, '25 in. long | (9) <i>D. parviflora</i> |
| Flowers medium, about '5 in. long, yellow. | |
| Leaves lanceolate acute almost or quite entire | (10) <i>D. flava</i> |
| Leaves ovate acuminate | (11) <i>D. ramosa</i> |
| Leaves unequal, narrow lanceolate, nearly or quite entire | (12) <i>D. flavescens</i> |
| Leaves ovate strongly toothed | (13) <i>D. urticæfolia</i> |
| Flowers medium, white, '75 to 1 in. long. | |
| Leaves equal ovate hairy, edges pubescent | (14) <i>D. hispida</i> |
| Leaves equal ovate very hairy, edges villous | (15) <i>D. hirta</i> |
| Leaves lanceolate thinly pubescent | (16) <i>D. viscida</i> |

- Leaves sub-glabrous, equal long-petioled, white with 2 yellow bars . . . (17) *D. albina*
- Leaves sub-glabrous smaller, white violet-striped . . . (18) *D. albinella*
- Leaves hairy; flowers solitary, white violet-striped . . . (19) *D. Robinsonii*
- Leaves glabrous when adult, sub-equal . . . (20) *D. modesta*
- Leaves glabrous unequal; flowers solitary on a short peduncle . . . (21) *D. alternans*
- Leaves glabrous unequal; flowers in pairs, long-peduncled . . . (22) *D. glabrata*
- Tall woody with large white flowers and broad bracts.
- Leaves winged to base . . . (23) *D. venusta*
- Leaves narrow, petioled . . . (24) *D. castaneæfolia*
- Thick-stemmed plants with fleshy, silky or hairy long-petioled leaves; flowers crowded at the top; corolla trumpet-shaped.
- Flowers yellow; leaves in distant pairs.
- Corolla 2 in. long . . . (25) *D. malayana*
- Corolla 1 in. long . . . (26) *D. albomarginata*
- Flowers brown and yellow small; leaves crowded at top of stem . . . (27) *D. flavobrunnea*
- Flowers white; leaves in distant pairs . . . (28) *D. Winkleri*
- iii. REPTANTES. Prostrate or creeping herbs. Leaves in distant pairs, hairy.
- Flowers blue or white.
- Leaves hairy, rarely sub-glabrous; flowers in upper axils . . . (29) *D. reptans*
- Leaves velvety.
- Flowers solitary, terminal . . . (30) *D. marginata*
- Flowers numerous on slender pedicels . . . (31) *D. pulchella*
- Flowers orange.
- Sepals hairy . . . (32) *D. crocea*
- Sepals sub-glabrous . . . (33) *D. ascendens*
- Flowers white; stem woody, creeping; peduncle 1-flowered . . . (34) *D. alba*
- iv. HETEROBÆA. Stems woody, short; leaves crowded at the top, lanceolate hairy, sessile (petiole winged to base); flowers large, solitary on slender peduncles; bracts small.
- Leaves wrinkled, glabrous . . . (35) *D. rugosa*
- Leaves tessellate, obovate, glabrous or with scattered hairs with bulbous bases oblanceolate.
- Capsule over 2 in. long; leaves with scattered bulbous hairs . . . (36) *D. platypus*
- Capsule over 1 in. long; leaves glabrous except nerves beneath . . . (37) *D. Kompsobœa*
- Leaves not tessellate, hairy or pubescent.
- Leaves broad covered with close, short hairs.
- Flowers white, tipped crimson . . . (38) *D. quinquevulnera*
- Flowers deep crimson . . . (39) *D. atrosanguinea*
- Leaves silky pubescent, white tinged blue . . . (40) *D. bombycina*
- Leaves narrow, thickly appressed, pale blue . . . (41) *D. crinita*

- Leaves narrow lanceolate not fasciate;
 sepals lanceolate, silky (42) **D. lanceolata**
- Leaves narrow shortly scattered, hairy
 deep green, a central white bar;
 flowers white (43) **D. fasciata**
- Leaves roughly hairy all over, broad
 oblanceolate (44) **D. Curtisii**
- Leaves alternate distant; stem over
 1 ft. tall; flowers yellow. (45) **D. hirsuta**
- v. PECTINATÆ. Leaves crowded at the top, narrow lanceolate dentate or
 pectinate or entire; flowers small, tubular.
- Leaves strongly toothed (46) **D. serratifolia**
- Leaves cut nearly to the midrib, fern-like (47) **D. pectinata**
- Leaves entire; corolla unknown (48) **D. densifolia**
- vi. BÆOPSIS. Leaves crowded in a tuft at the top of a woody root stock;
 peduncles slender; flowers usually small.
- Leaves 6 in. long, oblanceolate, decurrent
 to base; peduncles 1 ft. long;
 flowers yellow, small (49) **D. longipes**
- Leaves 4 in. long, scapes 2 in. long; flowers
 yellow (50) **D. primulina**
- Leaves small, elliptic peltate (51) **D. perdita**
- Leaves small obovate crenulate, hairy (52) **D. puncticulata**
- Leaves small obovate crenulate, glabrous
 above (53) **D. heterophylla**
- Leaves small oblong lanceolate, glabrous (54) **D. soldanella**
- Leaves small elliptic obovate petiolate silky (55) **D. pumila**
- Stem elongate; leaves opposite remote;
 flower 2 in. long, solitary, axillary (56) **D. grandiflora**

(1) **D. corchorifolia** R. Br. *Benn. Pl. Jav. Rar.* 119; *Ridl. Journ. As. Soc. Beng., l.c.* 747.

Shrub 4 to 6 ft. tall, branched. Leaves unequal ovate, sub-acute, base rounded unequal serrate, softly hairy all over, 3 to 9 in. long, 1.5 to 5 in. wide; petioles 1 to 4 in. long. Panicles lax axillary, 2 to 3 in. long, pubescent. Calyx cup-shaped, .25 in. long, 5-toothed. Corolla .75 in. long, white, throat apple green (often purplish white), tube straight thick, the two lips appressed together, lower much longer (as in *Antirrhinum*). Capsule cylindric, 1 to 2.5 in. long, pubescent. *Hab.* Mountain forests on rocks and banks at 3000 to 5000 ft. altitude. Selangor, Semangkok Pass. Perak, Bujong Malacca (Curtis); Thaiping Hills at 5500 ft. altitude (all collectors). Penang (Wallich, Curtis).

(2) **D. robusta** *Ridl. Journ. F.M.S. Mus.* vi. 52.

Several feet tall, stout, woody; stems and underside of leaves coppery woolly. Leaves whorled, 4 or more in whorl, ovate, thick, dentate, base round, 1.5 to 3 in. long, .75 to 1.25 in. wide; petioles very short or none. Peduncles slender, 6 in. long, hairy, bearing several umbelled cymes. Bracts ovate acute, glabrous. Calyx glabrous funnel-shaped. Corolla .75 in. long, .25 in. wide across limb, yellow, gradually dilate upwards. Capsule glabrous,

2 in. long acuminate. *Hab.* Mountains, rare. Perak, Gunong Kerbau at 6000 to 6600 ft. altitude (Robinson).

(3) *D. sulphurea* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 32; *Journ. As. Soc. Beng., l.c.* 747.

Shrubby creeping and ascending, 6 to 10 ft. long, pubescent, often zigzag. Leaves in very unequal pairs, big ones 3 in. long, 1.75 in. wide, small ones .5 to .75 in. long, .15 to .25 in. wide, ovate or lanceolate acute, base unequal cuneate, edge crenate-dentate, deep green above, purple beneath, hairy especially on back. Peduncles filiform, 4 to 6 in. long, pubescent; branches at top 2 or 3 with as many flowers. Sepals elliptic-ovate. Corolla funnel-shaped, .5 in. long, lower lip longest, yellow. Capsule 1.5 to 3 in. long, rather thick, glabrous. *Hab.* Mountain woods. Perak, Thaiping Hills to 5500 ft. altitude; Gunong Chabang and Gunong Bubu (Scortechini); Gunong Batu Putih to 4500 ft. altitude (Kunstler, Wray); Bujong Malacca; Gunong Berumbun Telom.

var. *breviflora* Ridl. Bracts and calyx-lobes narrower, acute, pubescent. Capsule .75 in. long, pubescent. Selangor, Bukit Kutu (Ridley).

var. *grandiflora* Ridl. Sepals broad lanceolate acuminate. Corolla much larger, 1.75 in. long, .5 in. wide. Leaves less hairy. Perak, Gunong Kerbau at 6000 ft. altitude (Robinson).

(4) *D. citrina* Ridl. *Journ. Linn. Soc.* xxxii. 508; *Journ. As. Soc. Beng., l.c.* 748.

Sub-herbaceous, 1 ft. tall. Leaves and stems softly white velvety-hairy. Leaves unequal, larger one 2 to 3 in. long, 1.25 in. wide, smaller about half as big, ovate-lanceolate, crenulate; petioles .5 in. long or less in small, up to 3 in. long in the large leaf. Panicles 3 in. long, bases pubescent, zigzag. Bracts ovate cordate, polished green, edges red; pedicels .5 to 1 in. long. Sepals triangular stiff, green edged red. Corolla lemon yellow, tube 1 in. long, funnel-shaped, mouth .5 in. across. Capsule 1 in. long, glabrous. *Hab.* Local on rocks on mountains, Kedah Peak, 2000 to 3800 ft. altitude (Ridley).

(5) *D. purpurea* Ridl. *Journ. Linn. Soc.* xxxii. 508; *Journ. As. Soc. Beng., l.c.* 748.

Stem herbaceous, 12 to 18 in. high. Leaves ovate acute, inæquilateral, velvety, 4 in. long, 2 in. wide, crenulate; petioles .25 to .5 in. long. Panicles erect, sub-terminal, 4 in. long, branches slender; peduncles 3 in. long. Bracts small, ovate. Sepals oblong, glabrous. Corolla tubular, purple; lobes round, lower lip longer. Capsule .5 in. long. *Hab.* Lankawi, Gunong Chinchang 1000 to 1500 ft. altitude (Curtis).

(6) *D. violacea* Ridl. *Journ. Linn. Soc.* xxxii. 509; *Journ. As. Soc. Beng., l.c.* 762.

Rootstock short erect; stem 1 in. tall, woolly. Leaves very

unequal, ovate to lanceolate acute, base narrow, oblique, dentate densely soft-hairy, 2 to 8 in. long, 1·25 to 2·25 in. wide; petioles 0 to 2 in. long. Panicles 2 to 5 in. long, lax; branches pubescent. Sepals oblong-lanceolate, glabrous. Corolla trumpet-shaped, curved, 5 in. long, violet, lower lip 2·25 in. longer than upper. Capsule glabrous, 75 in. long. *Hab.* Perak, Hermitage Hill, 5000 ft. altitude, on rocks in a stream (Ridley).

(7) *D. lacunosa* Hook. fil. *Bot. Mag. t.* 7236; *Ridl. Journ. As. Soc. Beng., l.c.* 762.

Stemless. Leaves crowded, oblong or ovate cordate, tomentose crenulate, 2 to 4 in. long, 1·5 to 2 in. wide; petioles 2 to 4 in. long, tomentose. Scapes 4 to 6 in. long, 2- to many-flowered, simple or branched at top. Corolla 1 in. long, deep violet blue, tube inflate upwards; lobes sub-equal. Capsule 2 in. long. *Hab.* Lankawi islands, Terutau on damp rocks (Curtis).

(8) *D. inæqualis* Ridl. *Journ. Linn. Soc.* xxxiii. 506; *Journ. As. Soc. Beng., l.c.* 753.

Stem woody, 5 in. or more tall, brown-pubescent. Leaves alternate distant lanceolate inæquilateral, acute serrate, narrowed to base, velvety above, pubescent beneath, 5 in. long, 1·5 in. wide or less; petioles pubescent, 5 in. long. Peduncles from upper axils, 1·5 in. long, pubescent. Flowers crowded, bracts linear, nearly 2·25 in. long. Calyx campanulate, lobes not free to base, linear pubescent. Corolla blue, 1 in. long; tube slender dilate upwards; lobes short, round. Capsule glabrous, 1·5 in. long. *Hab.* Lankawi, Gunong Chinchang (Curtis).

(9) *D. parviflora* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 35; *Journ. As. Soc. Beng., l.c.* 748.

Small erect herb 1 ft. tall or less, branched hairy. Leaves opposite, equal, lanceolate or ovate-lanceolate acute, glabrous above, hairy upon nerves and edge, 1 to 2 in. long, 2·25 to 5 in. across. Peduncles hairy, 1-flowered, 2·25 in. long. Sepals linear pubescent blunt. Corolla 2·25 in. long, yellow pubescent. Capsule slender, pubescent. *Hab.* Mountains. Negri Sembilan, Gunong Angsi. Perak, Thaiping Hills, Gunong Hijau to 4000 ft. altitude (Curtis).

(10) *D. flava* Ridl. *Journ. Linn. Soc.* xxxiii. 507; *Journ. As. Soc. Beng., l.c.* 749.

Half shrubby scabrid plant 1 to 3 ft. tall. Leaves lanceolate acute, narrowed to base, minutely serrulate or sub-entire, scabrid hairy, especially when young, appressed hairy on nerves beneath, 3 to 5 in. long, 1·5 to 2 in. wide; petioles 5 to 1 in. long, appressed hairy. Peduncles axillary and sub-terminal, hairy, 3 in. long; flowers 4 or 5 together. Sepals lanceolate hispid. Corolla glabrescent, yellow, 75 in. long, tube straight. Capsule 1·5 in. long, hairy. *Hab.* Mountain forests, sometimes below 1000 ft. altitude. Selangor, Kamuning (var. *purpurascens*) with purplish stems and broad

leaves. Perak, Thaiping Hills (all collectors). *Distrib.* Bandon, South Siam.

(11) ***D. ramosa*** *Ridl. Journ. Roy. As. Soc. S. Br.* 44, p. 34; *Journ. As. Soc. Beng., l.c.* 749.

Rather slender branched, pubescent with appressed hairs, over 1 ft. tall. Leaves in distant pairs, usually very unequal, ovate acuminate thin, base rounded or narrowed, glabrous above, sparingly hairy beneath, 2 to 3 in. long, 1.5 in. wide; petioles .125 in. long. Peduncles slender from lower axils, 1.25 in. long, 2-flowered, viscid hairy. Sepals lanceolate hispid. Corolla-tube straight, hardly dilate, .5 in. long, greenish yellow. *Hab.* Perak, Gunong Batu Putih (Wray); rare.

(12) ***D. flavescens*** *Ridl. Journ. Roy. As. Soc. S. Br.* 44, p. 35; *Journ. As. Soc. Beng., l.c.* 749.

Stem slender, over 1 ft. tall, shortly appressed-hairy. Leaves in distant unequal pairs, lanceolate acuminate at both ends entire, sparsely hairy all over, 1.5 to 2 in. long, .5 in. wide; petioles .15 to .2 in. long, silky hairy. Peduncles 1-flowered, 1 in. long, pubescent. Sepals linear hairy. Corolla yellowish white, .5 in. long, pubescent, tube straight, hardly dilate above, 2-lipped. *Hab.* Mountains. Selangor, Kwala Kubu; Sempang Mines, Semangkok (Ridley).

(13) ***D. urticæfolia*** *Ridl.*

Over 6 in. tall, slender herbaceous hairy with stiff spreading hairs all over. Leaves thin in distant pairs, nearly equal, lanceolate, minutely serrulate, base cuneate, 3.25 in. long, 1 to 1.75 in. wide; petioles 1 to 1.5 in. long, hairy. Peduncles slender in uppermost axils, 2 in. long, hairy. Flowers 2. Sepals lanceolate, narrow dense hairy, .12 in. long. Corolla yellow, tubular at base, dilate upwards sparsely hairy, 1 in. long, .25 in. wide, lower lip longer. Capsule 1.25 in. long, rather thick at base, shortly sparsely hairy. *Hab.* Perak, Temengoh (Ridley); Thaiping Hills, Gunong Hijau to 4000 ft. altitude (Curtis).

(14) ***D. hispida*** *Ridl. Journ. Linn. Soc.* xxxiii. 507; *Journ. As. Soc. Beng., l.c.* 750. *D. hispidula* *Ridl. Journ. Roy. As. Soc. S. Br.* 44, p. 35.

Stem 6 to 12 in. tall, hispid. Leaves in rather distant opposite equal pairs scabrid above, hairy beneath, especially on nerves, ovate or lanceolate shortly narrowed or blunt at base, sub-acute, crenulate, dentate or nearly entire; nerves conspicuous, 3 to 5 in. long, 1 to 2 in. wide; petioles 1 in. long. Peduncles 3 in. long, hairy, branched or bearing 3 or 4 flowers in a cyme; pedicels .2 to .5 in. long. Sepals lanceolate hairy. Corolla glabrous, 1 in. long, white with violet streaks in the mouth, tube straight, funnel-shaped, lower lip longer. Capsule 1.5 in. long. *Hab.* Mountains, variable according to locality. Perak, Thaiping Hills at the top (all collectors); Gunong Kerbau (Robinson); Gunong Inas (Yapp).

var. *selangorensis* Ridl. Much less hairy, leaves usually thinner, more lanceolate, flowers few. Selangor, Sempang mines (Ridley); Menuang Gasing, Ulu Langat (Kloss).

(15) **D. hirta** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 36; *Journ. As. Soc. Beng., l.c.* 750.

Stem about 1 ft. to 18 in. tall, like the leaves, densely long-hairy. Leaves elliptic-lanceolate acuminate both ends or obovate acute, 1.5 to 2 in. long, 1.25 in. wide, rather unequal; petioles .25 in. long, hairy. Peduncles 2.5 in. long, 1-flowered, red-hairy. Sepals linear narrow hairy. Corolla glabrous, nearly 1 in. long, white, lower lip much longer. Capsule curved, .75 in. long, puberulous. *Hab.* Mountain forest, Selangor, Semangkok Pass (Ridley).

This is near *hispida* but very long-hairy.

(16) **D. viscida** Ridl. *Journ. Roy. As. Soc. S. Br.* 43, p. 36; *Journ. As. Soc. Beng., l.c.* 750.

Stems slender, 6 in. long, short, rough hairy. Leaves thin, opposite lanceolate or ovate-lanceolate acuminate, base unequal, scabrid hairy above; nerves 6 pairs, hairy beneath; 3 to 4 in. long, 1 to 1.5 in. wide; petioles .5 in. long, rough hairy. Peduncle 2 in. long, viscid hairy; cyme branches 1 in. long. Sepals very short, lanceolate viscid hairy. Corolla over .5 in. long, tube swollen at base then funnel-shaped, white sparingly pubescent. Capsule viscid-hairy, 1 in. long. *Hab.* Perak, Gunong Keledang (Ridley). Rare.

(17) **D. albina** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 37.

A large plant 2 to 4 ft. tall; stem olive fuscous thickly viscid hairy. Leaves equal ovate-lanceolate acuminate at both ends, serrulate, dark green above and glabrous, purple beneath with an appressed hairy midrib; nerves elevate, 3 to 5 in. long, 1 to 2 in. wide; petioles .5 in. long. Peduncles 4 in. long, branched with several flowers. Sepals lanceolate acuminate purplish viscid hairy. Corolla-tube .75 in. long, upper lobes truncate, lower longer, laterals oblong, medium one ovate, all white with 2 yellow bars edged with violet spots in the mouth. *Hab.* Mountain forests at about 4000 ft. altitude, Pahang, Telom, abundant and very conspicuous; Selangor, Gunong Mengkuang Lebah (Robinson); Hulu Semangkok. Perak, Gunong Kerbau (Haniff); Gunong Batu Putih (Wray). *Distrib.* Sumatra.

(18) **D. albinella** Ridl. *Journ. F.M.S. Mus.* iv. 51.

Herb over 1 ft. tall, pubescent hairy. Leaves sub-equal, ovate or lanceolate acuminate, base cuneate serrulate, above glabrous, beneath hairy on nerves and edges, 3 to 4 in. long, 1 to 2 in. wide; petioles hairy, .5 to .75 in. long. Cyme 3 to 4 in. long, glandular hairy; flowers several. Sepals linear acuminate, viscid hairy. Corolla .75 in. long; tube broad; limb wide, white striped violet.

Capsule pubescent. *Hab.* Pahang, Gunong Berumbun, Telom at 6000 ft. altitude (Ridley).

Near *D. albina*, but smaller in all parts, inflorescence little branched and colour different.

(19) ***D. Robinsonii*** *Ridl. Journ. Linn. Soc.* xxxviii. 318.

Shrubby plant over 1 ft. tall, hairy, branched. Leaves paired, sub-equal lanceolate acuminate at both ends, crenulate hispid, sub-glabrous beneath, 2 in. long, .75 in. wide; petioles hairy, .25 in. long. Flowers in upper axils; peduncles 2 in. long. Sepals lanceolate-linear, 4, glandular hairy. Corolla infundibuliform pubescent, white streaked violet, yellow blotched in tube, lower lobe longer than upper, 1 in. long, .3 in. across. *Hab.* Mountains at 3000 ft. altitude, Pahang, Gunong Tahan in the Gully (Robinson and Ridley).

(20) ***D. modesta*** *Ridl. Journ. F.M.S. Mus.* vi, 53.

Stem slender unbranched, 6 to 8 in. long, appressed hairy. Leaves in distant pairs equal lanceolate acuminate both ends, entire thin glabrous except nerves, 4 pairs beneath and edges hairy, 2 to 3 in. long, .5 to 1 in. wide; petioles .25 to .4 in. long, slender hairy. Flowers solitary axillary in upper axils; peduncles .5 to 3 in. long, hairy. Sepals narrow setaceous, purple-hairy. Corolla white or yellow, narrow at base gradually dilate upwards, sparsely hairy, lobes oblong, .4 to .1 in. long, limb .25 in. wide. Capsule straight, 1.1 in. long, glabrous. *Hab.* Perak, Gunong Kerbau at 3000 to 5000 ft. altitude (Robinson). A smaller form with sparsely hairy leaves rather broader and very short peduncles, .24 in. long, occurred with it at 3500 ft. altitude.

(21) ***D. alternans*** *Ridl. Journ. Roy. As. Soc. S. Br.* 44, p. 37; *Journ. As. Soc. Beng., l.c.* 751.

About 1 ft. tall, scabrid hairy. Leaves thin, sub-alternate and opposite, lanceolate acuminate, base inæquilateral cuneate, entire or slightly serrate, 3 in. long, 1.25 in. wide, nearly glabrous, only midrib and petioles .25 in. long, scabrid hairy; opposite leaf a small ovate blade .5 in. long or absent. Flowers solitary, on axillary peduncles .25 in. long or less. Sepals lanceolate acute, hairy. Corolla .5 in. long, white, throat yellow; tube narrowed at base, dilate upwards, pubescent; lips sub-equal. Capsule glabrous, 1 in. long. *Hab.* Mountains up to 4000 ft. altitude. Perak, Bujong Malacca (Curtis); Thaiping Hills (Kunstler).

(22) ***D. glabrata*** *Ridl. Journ. Roy. As. Soc. S. Br.* 44, p. 38 *Journ. As. Soc. Beng., l.c.* 751.

Slender branched herb over 1 ft. tall, almost glabrous, slightly pubescent on stem and petioles. Leaves opposite, sub-equal elliptic or ovate, sub-acute, base cuneate or round oblique, entire, 1.5 to 3 in. long, 1 in. wide; petioles slender pubescent, .25 in. long or less. Peduncles 2-flowered, 2 in. long, pubescent. Sepals

narrow lanceolate. Corolla white. Capsule 1·5 in. long, pubescent. *Hab.* Johor, Gunong Pantai (Kunstler). Rare.

(23) *D. venusta* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 51.

Stem erect, woody, 12 to 18 in. tall. Leaves opposite in distant pairs oblong-lanceolate sub-acute crenulate-serrate, narrowly decurrent on the petiole, glabrous except the 22 pairs of nerves beneath, red-hairy, 4 to 6 in. long, 1 to 2 in. wide. Peduncles axillary, 1 or 2 hairy, 7 in. long. Flowers 2. Bracts 2, oblong cuspidate, glabrous, 4 in. long. Sepals linear acuminate, pubescent, 5 in. long. Corolla funnel-shaped, 1·5 in. long, pure white with a brown spot on lower lip, lower lip 5 in. long, much longer than upper. Capsule glabrous, 2 to 2·5 in. long. *Hab.* Mountains at 3000 to 5000 ft. altitude, Pahang, Gunong Berumbun, Telom. Selangor, Semangkok Pass. Perak, Bujong Malacca (Ridley).

(24) *D. castaneæfolia* Ridl. *Journ. Roy. As. Soc. S. Br.* 86, p. 302.

Stem erect, woody, over 4 in. long, 2 in. thick, corky. Leaves chartaceous lanceolate elliptic sub-acute, base cuneate, edge closely serrate, glabrous except midrib and nerves in young leaves; nerves about 25 pairs, parallel sunk above inarching within the margin; 5 in. long, 2 in. wide; petioles 5 in. long, hairy. Scapes 7 in. long in the axils, hairy with about 5 flowers, the lower pair distant from the terminal ones. Bracts lanceolate-linear, green, hairy, 4 in. long; pedicels 25 in. long, purple hairy. Sepals lanceolate acuminate, 12 in. long. Corolla 1·5 in. long; tube cylindric at base gradually dilate upwards, limb 5 in. wide; lobes blunt rounded. Capsule 2·5 in. long, narrow cylindric. *Hab.* Mountains, Perak, Gunong Inas at 5000 ft. altitude (Yapp 438).

Allied to *D. venusta*, but the leaves more closely serrate, and distinctly petioled.

(25) *D. malayana* Hook. *fil. Gard. Chron.* ii. 123, fig. 24; *Bot. Mag. t.* 7526; *Ridl. Journ. As. Soc. Beng., l.c.* 752.

Stem very short up to 3 in. long. Leaves ovate blunt or rounded, rather firm, sometimes lanceolate acute, silky hairy, 7 in. long, 2·75 in. wide; petioles 1·5 to 2 in. long. Peduncles 3 to 4 in. long, with 2 to many flowers on erect branches. Sepals linear pubescent. Corolla 2 in. long, narrow at base, inflated upwards, lobes sub-equal, bright yellow. Capsule cylindric acuminate, rather thick, 1 to 1·5 in. long. *Hab.* Mountains, usually about 1500 to 3000 ft. altitude. The "Malay Cowslip," a most beautiful plant with its large nodding yellow flowers. Selangor, Ginting Bidai; Semangkok Pass; Bukit Kutu. Perak, Bujong Malacca (Curtis); Tanjong Malim (Baldwin); Chabang (Scortechini); Ulu Bubong and Ulu Kerling (Kunstler); Gunong Kerbau (Robinson).

var. *fasciata* Ridl. A compact round-leaved form with a white central bar on the leaf.

(26) **D. albomarginata** Hemsley, *Journ. Bot.* 1887, p. 204; *Ridl. Journ. As. Soc. Beng., l.c.* 752.

Stem 6 to 12 in. tall, red pubescent. Leaves dark green, edges and nerves white, elliptic or ovate, base broad or shortly cuneate, sparsely hairy above, white silky beneath, 3 to 4 in. long, 1 to 1.5 in. wide; petioles .5 to 2.5 in. long. Peduncles axillary sometimes 6 in an axil and terminal, pink, 3 in. long, sometimes branched. Sepals lanceolate hairy. Corolla slender, .5 in. long, limb .25 in. across, tube narrow, pinkish white, lobes yellow. Capsule rather thick upcurved hairy, .75 in. long. *Hab.* Mountain forests, local. Perak, Thaiping Hills (all collectors).

This is much like *D. malayana*, especially var. *fasciata*, but the flowers are much smaller.

(27) **D. flavobrunnea** Ridl. *Trans. Linn. Soc.* iii. 329; *Journ. As. Soc. Beng., l.c.* 753.

Stem woody, 3 to 12 in. tall, above densely pubescent. Leaves alternate ovate-lanceolate acuminate, narrowed to base, serrate sparsely hairy; nerves and midrib densely hairy; 7 in. long, 3 in. wide. Peduncles solitary axillary, 8 in. long, hairy. Flowers numerous in a crowded head-like panicle. Bracts leafy, .25 in. long, lanceolate acute. Sepals linear pubescent. Corolla 1 in. long, tube straight, cylindric, dilate towards mouth, brown outside, lobes short, yellow with an orange spot in mouth and some red streaks. Capsule 1 in. long, narrowed to tip. *Hab.* Forests by river banks, Pahang, Tahan River woods (Ridley).

var. *montana* Ridl. Leaves much more hairy. Corolla-lobes with broad maroon bars; a much bigger plant. *Hab.* Pahang, Wray's Camp, Gunong Tahan at 3500 ft. altitude (Ridley).

(28) **D. Winkleri** Ridl. *Journ. Roy. As. Soc. S. Br.* 50, p. 123.

Stem stout, over 3 in. tall, densely silky hairy. Leaves elliptic-lanceolate blunt, slightly narrowed at base, silky-silvery all over, 6 in. long, 2.75 in. wide; petioles silky, 3 in. long. Scapes 6 in. long, purple silky. Flowers paniced, white. Sepals lanceolate, hairy. Corolla 1.25 in. long, white pubescent, tube thick, dilate upwards; lobes rounded. Capsule pubescent, 1 in. long. *Hab.* Negri Sembilan, Gunong Angsi (Winkler).

The locality given as Batu caves in the original description was wrong. Dr. Winkler told me later he gathered it on Gunong Angsi.

(29) **D. reptans** Jack, *Mal. Misc.* i. (2), 3; *Ridl. Journ. As. Soc. Beng., l.c.* 754.

A villous or pubescent creeper, 6 in. or more long. Leaves elliptic or ovate blunt, base narrowed or rounded crenulate hairy especially beneath, .75 to 3 in. long, .5 to .75 in. wide; petioles .25 in. long. Peduncles sub-terminal and axillary, .1 in. long, 1-flowered. Sepals linear villous. Corolla .5 in. long, pubescent, white with purple and yellow streaks in mouth, trumpet-shaped.

Capsule 1 in. long, scabrid. *Hab.* Forests, Selangor, Bukit Kutu; Kanching. Penang Hill (Wallich and all collectors).

var. *monticola* Ridl., l.c. 755. More slender. Leaves narrow lanceolate acute, base long-narrowed rufous-hairy. *Hab.* In dense damp forests, Selangor, Semangkok Pass; Ginting Bidai. Negri Sembilan, Bukit Tumiang and Bukit Sulu (Cantley). Dindings, near Lumut. Perak, Thaiping Hills (all collectors); Goping (Kunstler); Gunong Batu Putih (Wray). *Distrib.* Sumatra.

var. *violascens* Ridl., l.c. 755. Stems ascending for 1 ft. Leaves nearly glabrous above, but densely hairy on edge and midrib, and more hairy beneath; nerves elevate. Flowers purplish white on very short pedicels. *Hab.* Selangor, Rawang and Dusun Tua (Ridley).

var. *modesta*, *D. modesta* Ridl. *Journ. Roy. As. Soc. S. Br.* 82, p. 186 (not of *Journ. F.M.S. Mus.* vi. 53).

Stem ascending, 1 ft. long, densely hairy. Leaves hairy on both sides, elliptic, base narrowed, 3 in. long, 1 in. wide. Pedicels .2 in. long or less. Corolla white, tube cylindric, .25 in. long; lobes short, round, sub-equal pubescent. *Hab.* Selangor, Ulu Gombak; Rantau Panjang (Kloss).

I first separated this variety as a species on account chiefly of the nearly regular corolla limb, and inadvertently gave it the same name as another species. I think, however, it is really a variety only of *reptans*.

(30) *D. marginata* Clarke, DC. *Mon. Phan.* v. 96. *D. ophirensis* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 43; *Journ. As. Soc. Beng.*, l.c. 755.

Stem pubescent creeping, over 1 ft. long. Leaves somewhat elliptic obtuse, base shortly narrowed, dark green; midrib and nerves whitish, 1 to 3 in. long, .5 to 1 in. wide, sparsely hairy above, more densely beneath. Peduncles sub-terminal, 1 in. long, hairy. Sepals linear, densely hairy. Corolla .75 in. long, dilated upwards hairy, purple and white. Capsule cylindric, hairy, 1 in. long. *Hab.* Malacca, lower part of Mt. Ophir below Padang Batu (Lobb, Ridley). Rare on rocks.

(31) *D. pulchella* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 44; *Journ. As. Soc. Beng.*, l.c. 755.

Stem slender, 3 to 6 in. long, purple, appressed hairy. Leaves elliptic blunt, 1 to 2 in. long, dark green above with central white stripe, sparsely hairy, beneath purple, sparsely hairy, nerves and edges more so; petioles .25 to .5 in. long. Peduncles 1 in. long; pedicels .5 in. long. Sepals linear, all hairy. Corolla white, mouth yellow, 1 in. long, tube cylindric hardly dilate, sparsely hairy. Capsule 1.5 in. long, pubescent. *Hab.* Pahang, Kwala Lipis (Machado).

(32) *D. crocea* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 44; *Journ. As. Soc. Beng.*, l.c. 756.

Stems succulent creeping pubescent, 1 ft. long or more. Leaves

unequal ovate blunt, green veined white, softly hairy, 1 to 3 in. long, .75 to 1.25 in. wide; petioles .25 in. long. Peduncles sub-terminal, 1 to 3 in. long, 1-flowered, hairy. Sepals linear pubescent, .2 in. long. Corolla orange yellow, pubescent, 2 in. long, lobes round, darker orange. Capsule 1.25 in. long, rather thick upcurved pubescent. *Hab.* Woods. Perak, Gunong Keledang (Curtis); Sungkai (Kunstler).

(33) *D. ascendens* Ridl. *Journ. Linn. Soc.* xxxii. 512; *Journ. As. Soc. Beng., l.c.* 756.

Stem slender, creeping ascending branched above, 4 to 8 in. tall. Leaves sub-equal ovate sub-acute, base narrow or broad, entire, dark green, edge silky, 1.5 to 2 in. long, .5 to 1 in. wide; petioles 1 in. long or less. Peduncles .5 to 1 in. long, 1-flowered. Sepals linear acuminate silky. Corolla orange yellow, 1.5 in. long, narrow cylindric, dilate above. Capsule 1 in. long, acuminate. *Hab.* Banks in woods. Perak, Tapah (Haviland, Curtis); Goping (Kunstler). Kelantan, Chaning (Ridley).

(34) *D. alba* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 41; *Journ. As. Soc. Beng., l.c.* 754.

Stem woody, creeping, ascending, hairy pubescent. Leaves crowded towards top, lanceolate, base acute, densely softly whitish hairy on both sides, 2 in. long, .25 to .5 in. wide; petioles densely hairy, .5 in. long. Peduncles 1-flowered, .5 in. long. Sepals linear long hairy. Corolla pure white, .5 in. long, cylindric gradually dilated upwards, hairy. Capsule .75 in. long, curved acuminate, glabrous. *Hab.* Mountain forests, Perak, Bujong Malacca (Curtis).

var. *major* Ridl., *l.c.* 754. Stems over 1 ft. tall. Leaves more remote, less hairy. Peduncles 1 in. long in flower, 1.25 in. long in fruit. Corolla 1 in. long. *Hab.* Perak, Gunong Bubu (Wray).

(35) *D. rugosa* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 45.

Stem 2 to 3 in. tall, woody. Leaves oblong-lanceolate, dentate decurrent to base of petiole, glabrous and bullate above, pubescent and nerves hairy beneath; nerves very numerous, 40 pairs; 3 to 5 in. long, 1.5 to 2 in. wide. Peduncles hairy, 3 in. long. Flower solitary. Sepals ovate acute. Corolla trumpet-shaped, 1 in. long, white with yellow bar. *Hab.* Forests, Perak, Hulu Selama (Scortechini). Kelantan, Kwala Lebir (Gimlette).

(36) *D. platypus* Clarke, *DC. Mon. Phan.* v. (1), 94; *Ridl. Journ. As. Soc. Beng., l.c.* 757.

Stem woody. Leaves sessile oblanceolate, 8 to 13 in. long, 3 in. wide, serrate, sprinkled with hairs from swollen base, beneath glabrous; nerves and reticulations appressed hairy. Peduncles numerous, 1 in. long, 1-flowered, hairy. Sepals ovate-oblong, .1 in. long, hairy. Corolla 1.25 in. long, base slender dilate upwards, hairy white, limb .5 in. wide, mouth yellow. Capsule pubescent, 1.5 in. long, slender. *Hab.* Low country in forests, common in the south. Singapore, Bukit Timah; Selitar; Johor

Gunong Pulai; Ulu Batu Pahat (Kelsall). Malacca, Chabau (Griffith); Ayer Panas (Maingay). Selangor, Kwala Lumpur; Rantau Panjang (Kloss). Negri Sembilan, Perhentian Tinggi; Bukit Temiang (Cantley). Perak, Goping (Kunstler); Gunong Batu Putih (Wray). *Distrib.* Sumatra.

(37) **D. Komsobocœa** Clarke, DC. *Mon. Phan.*, l.c. 92, t. 10; *Ridl.*, l.c. 757.

Stem woody, 4 to 5 in. tall. Leaves oblanceolate acute narrowed to base, crenate-dentate, glabrous above; nerves hairy beneath; 5 to 9 in. long, 2 to 3 in. wide. Peduncles 1-flowered, 4 in. long, hairy. Sepals ovate hairy. Corolla white, throat yellow, tube 1 in. long, nearly glabrous, somewhat abruptly swollen above. Capsule 1.75 in. long, rather thick pubescent. *Hab.* Mountains in forests at 2000 to 3000 ft. altitude. Pahang, Tahan River woods and Gunong Tahan at Wray's Camp (Ridley). Selangor, Bukit Hitam (Kelsall). Perak, Sira Rimau, foot of Gunong Inas (Yapp). *Distrib.* Borneo.

The Tahan plant had a woody stem nearly a foot tall and lilac flowers with a white tube.

(38) **D. quinquevulnera** Ridl. *Trans. Linn. Soc.* iii. 328; *Journ. As. Soc. Beng.*, l.c. 758.

Stem woody, 6 to 9 in. tall, brown woolly. Leaves lanceolate acuminate acute serrate narrowed to base, dark green silky-pubescent, 6 in. long, 2 to 2.5 in. wide. Peduncles numerous, rosy white, ciliate. Sepals lanceolate acute. Corolla 3 in. long, tube white, lobes crimson, violet purple or almost blue edged with white, throat streaked yellow. Capsule 3.5 in. long. *Hab.* In woods on banks. Malacca (Hervey). Pahang, Tahan River woods; Kota Glanggi. Selangor, Semangkok Pass (Ridley). Perak, Gunong Kerbau (Robinson).

(39) **D. atosanguinea** Ridl. *Trans. Linn. Soc.* iii. 328; *Journ. As. Soc. Beng.*, l.c. 758.

Stem woody, 6 in. tall, stout. Leaves lanceolate acute crenulate-denticulate or dentate, base broad, green velvety pubescent above, glaucescent pubescent beneath, 9 in. long, 4 in. wide. Peduncles 3 in. long, pubescent. Sepals linear acute pubescent, .25 in. long, red. Corolla 2 in. long, pubescent, deep red, yellow in throat. *Hab.* In mountain woods, Pahang, Tahan River woods. Tringganu (Ridley). Kelantan, Kwala Aring (Yapp).

(40) **D. bombycina** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 48; *Journ. As. Soc. Beng.*, l.c. 759.

Stem 3 to 4 ft. long, woody above silky pubescent. Leaves lanceolate acuminate minutely crenulate densely silky all over; nerves very numerous and close; 4 to 6 in. long, 1 in. wide. Pedicels 1 in. long, silky. Sepals ovate acute silky. Corolla-tube 1 in. long, pubescent trumpet-shaped, white tinted blue or pink with

yellow stripes inside. *Hab.* Perak, Ulu Bubong (Kunstler); Ulu Temengoh (Ridley).

The height is given from Kunstler's notes. I have only seen it about 1 ft. tall.

(41) **D. crinita** Jack, *Mal. Misc. I.* ii. 1; *Trans. Linn. Soc.* xiv. 33, t. 2, fig. 2; *Bot. Mag.* t. 4554; *Ridl. Journ. As. Soc. Beng.*, l.c. 759.



FIG. 124.—*Didymocarpus crinita*.

Stem woody, about 6 in. tall. Leaves narrow lanceolate acute, serrate densely softly velvety hairy, 6 in. long, 1 in. wide, dark green sometimes with a longitudinal white bar and purple beneath with longer hairs. Peduncles 1 to 2 in. long, villous. Sepals narrow lanceolate acute villous. Corolla 1.5 to 1.75 in. long, trumpet-shaped, pale blue or nearly white to white with blue lobes. Capsule slender, 2 to 3 in. long, pubescent. *Hab.* Hill forests, common in northern parts. Penang Hill (all collectors), type form. Kedah Peak. Tomoh (Machado). Kelantan, Kwala Lebir (Gimlette). Form with broader leaves, fimbriate at base, Perak,

Thaiping Hills (all collectors). Selangor, Ginting Bidai; Kanching. Sungei Ujong, Bukit Sulu (Cantley). Pahang, Tahan River woods.

var. *elongata* Ridl., l.c. 760. Stem tall and sometimes branched with leaves in scattered pairs, 3 in. long, .5 in. wide. Flowers 1 in. long, pale blue, axillary. *Hab.* Perak, Tapah (Curtis, Ridley). *Distrib.* Sumatra, Borneo.

(42) *D. lanceolata* Ridl. *Journ. F.M.S. Mus.* iv. 50.

Stem woody hairy. Leaves lanceolate acuminate, closely finely dentate, dark green hairy above, pale beneath, thickly hairy on nerves. Peduncle slender solitary or in pairs pubescent. Sepals lanceolate acute densely silky hairy, .12 in. long. Corolla glabrous, trumpet-shaped, 1 in. long, white with yellow spot in mouth. Capsule narrow, over 1 in. long, pubescent. *Hab.* Mountain forests 4000 ft. altitude, very rare. Pahang, Cameron's Plateau to Gunong Irau (Robinson and Kloss).

This is near to *D. fasciata*, but the leaf has no white central bar, the sepals are wider and the corolla smaller.

(43) *D. fasciata* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 50; *Journ. As. Soc. Beng.*, l.c. 760.

Stem woody, 6 to 8 in. tall, softly hairy above. Leaves alternate scattered below, narrow-lanceolate minutely serrulate crenate acuminate, long narrowed to base, above densely sprinkled with thick-based hairs, deep velvety malachite green, with a broad central white bar, beneath densely velvety hairy, 4 to 8 in. long, 1.5 in. wide. Peduncles 1.5 in. long. Sepals lanceolate, very small. Corolla 1.5 in. long, cylindric trumpet-shaped, white, limb edged violet. Capsule very slender, 2 in. long, glabrous. *Hab.* Mountain rocky woods, local. Pahang, Tahan River. Kedah Peak (Ridley). *Distrib.* Lingga and Borneo (*D. crinita* var. *tuberculata* Clarke).

(44) *D. Curtisii* Ridl. *D. crinita* var. *Curtisii* Ridl. *Journ. As. Soc. Beng.*, l.c. 759.

Woody, stem stout, 6 in. tall. Leaves oblong-ob lanceolate, narrowed to base closely denticulate, above sprinkled thickly with bullate hairs, beneath punctate, purple with long hairs, densely hairy on midrib and nerves; 6 to 7 in. long, 2 in. wide (at widest part). Peduncles numerous, hairy, 3 to 4 in. long. Sepals oblong-lanceolate blunt, sparsely hairy. Corolla 2 in. long, blue, sparsely hairy, limb 1 in. across. *Hab.* Mountain forests, Selangor, Semangkok Pass (Curtis, Ridley).

I think this is really nearer to *D. platypus*, but much more hairy and with blue flowers.

(45) *D. hirsuta* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 48; *Journ. As. Soc. Beng.*, l.c. 758.

Stem woody, over 12 in. long, hairy. Leaves alternate remote, 1 in. apart, lanceolate acuminate, narrowed to base, crenate serrate

densely rough hairy all over, 6 in. long, 1.5 in. wide; petioles distinct, .5 in. long. Peduncles in upper and lower axils slender, hairy. Sepals ovate-lanceolate blunt. Corolla-tube narrow, funnel-shaped above, pubescent yellow. Capsule very narrow pubescent, 3 in. long. *Hab.* Perak, Goping and Thaiping Hills (Kunstler).

This is very distinct in this group from having the stem drawn out with alternate leaves.

(46) **D. serratifolia** *Ridl. Journ. As. Soc. Beng.* lxxiv. (2), 761. *D. serrata* *Ridl. Journ. Roy. As. Soc. S. Br.* 44, p. 52 (*not of R. Br.*).

Stem woody, 6 in. long or less, hairy above. Leaves numerous lanceolate acute, base narrowed, winged to base or nearly so, strongly, sharply toothed, glabrous above, midrib densely hairy beneath; nerves 40 pairs; 8 in. long, 1 in. wide. Scape slender, hairy, 3 in. long. Flowers 4 to 5, sub-sessile. Sepals ovate hairy. Corolla trumpet-shaped, .75 in. long, base narrowed, lower lip longer than upper; limb .25 in. across, midlobe longer than the others, white stained purple, outer throat yellow. Capsule very slender, pubescent, over 1 in. long. *Hab.* On rocks by a stream; dense jungle. Rare. Perak, Thaiping Hills at about 1500 ft. altitude (Ridley).

(47) **D. pectinata** *Clarke and Oliver, Ic. Pl. t.* 2246; *Ridl. Journ. As. Soc. Beng., l.c.* 762.

Stem 6 in. tall, shrubby branched. Leaves densely crowded at top, glabrous, deeply pectinate, 6 to 7 in. long, lobes cut to near the midrib, triangular blunt, .4 in. long, .125 in. wide at base. Peduncles several, pubescent, 2 in. long. Sepals lanceolate-acute. Corolla cylindric slightly inflated upwards, white tomentose, .3 in. long. Capsule .5 to .75 in. long, rather thick. *Hab.* Forests, rare. Selangor, Rawang (Ridley). Perak, on limestone rocks (Kunstler).

(48) **D. densifolia** *Ridl. Journ. Roy. As. Soc. S. Br.* 44, p. 51; *Journ. As. Soc. Beng., l.c.* 760.

Stem woody, 3 ft. tall. Leaves crowded alternate lanceolate acuminate narrowed to base, rather thick, glabrous except a few hairs on midrib, entire, 1.5 to 5 in. long, .25 to .75 in. wide. Peduncles hairy, slender, 3 in. long with a few branches. Sepals linear-oblong pubescent. Capsule cylindric, 1 in. long. *Hab.* Very rare, mountains, Johor, Gunong Janeng (Kelsall).

As I was unable to get corollas, this plant is doubtful and may be a *Parabæa*.

(49) **D. longipes** *Clarke, DC. Mon. Phan.* v. (1), p. 86; *Ridl. Journ. As. Soc. Beng., l.c.* 756.

Stem woody, 2 in. long, top hairy. Leaves crowded at the top, 4 or 5, oblanceolate gradually narrowed to the base, obscurely serrate, rather fleshy glabrous except the sparsely hairy midrib beneath, bright green above, purple beneath, 8 in. long, 2.25 in.

wide; petioles densely hairy, .25 in. long. Scape sub-terminal graceful, 9 to 18 in. long, purple. Flowers few, pendulous, racemose. Sepals linear acuminate pubescent, purple. Corolla 1.25 in. long, pale yellow, pubescent, tube straight, little dilate. Capsule 1.25 in. long, rather thick. *Hab.* Very local and now scarce, on rocks. Malacca, Mt. Ophir (all collectors).

(50) ***D. primulina*** Ridl. *Journ. F.M.S. Mus.* x. 250.

A herb with a short closely hairy stem about 1 to 4 in. long. Leaves about 6, elliptic round at the tip, base round or shortly narrowed, above glabrous, beneath softly densely hairy, edge thickly hairy; nerves 8 pairs; 4.5 in. long, 2.75 in. wide; petioles 1 to 2 in. long, densely hairy. Scapes very numerous erect slender, in upper axils 1-flowered, 2 in. long, hairy. Calyx-lobes linear acuminate, .2 in. long. Corolla-tube .5 in. long, upper lobes oblong blunt, .2 in. long, lower lip .4 in. long, lobes broad oblong round, all primrose-yellow with an orange patch in the mouth. Stamens as long as tube. Capsule slender acuminate, 1.5 in. long, glabrous. *Hab.* Dense forest, Selangor, Klang Gates on Bukit Lompat Bayan (Ridley and Kloss).

(51) ***D. perdita*** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 54; *Journ. As. Soc. Beng., l.c.* 763.

Stem creeping, woody, 4 in. long. Leaves elliptic blunt rounded, peltate crenulate, 3 in. long, 1.5 in. wide, above scabrid and sprinkled with hair, beneath glabrous except hairy nerves and edges; petioles 1 to 2 in. long, hairy. Peduncles slender, hairy, 4 in. long. Sepals lanceolate pubescent. Corolla not seen. Capsule .5 in. long, narrowed abruptly into style. *Hab.* Very rare, only 2 specimens seen in a ravine, now probably extinct. Singapore, Selitar (Ridley).

(52) ***D. puncticulata*** Ridl. *Journ. Linn. Soc.* xxxii. 510; *Journ. As. Soc. Beng., l.c.* 763.

Nearly stemless. Leaves crowded elliptic or obcuneate or nearly oblanceolate inaequilateral, base truncate, crenate punctulate hispid; nerves elevate hairy beneath; 3 in. long, 1.5 in. wide. Peduncles 3 in. long, slender (thicker in fruit) hairy. Sepals lanceolate acute hairy. Corolla .25 in. long, violet; tube short broad campanulate, lower lip longer than upper. Stamens very short. Capsule .5 in. long, thick hispid. *Hab.* Johor, Gunong Pantai (Ridley). Very rare.

(53) ***D. heterophylla*** Ridl. *Trans. Linn. Soc.* iii. 329; *Journ. As. Soc. Beng., l.c.* 763.

Stem short, woolly above, root woody. Leaves crowded, very variable obovate oblique or lanceolate blunt, crenulate, dark green, centre purplish, glabrous above, reddish with elevate nerves red-woolly beneath; 4 in. long, 1.5 in. wide or less. Peduncles slender, hairy, 3 in. long, few and short branched. Flowers few. Sepals linear pubescent. Corolla campanulate, .25 in. long, violet pubescent. Capsule cylindric acuminate curved, 1 in. long. *Hab.*

Local by mountain streams. Johor, Gunong Janeng (Kelsall). Perak, Tahan River (Ridley).

(54) *D. soldanella* Ridl. *Journ. Roy. As. Soc. S. Br.* 61, p. 33.

Stem short. Leaves 12 in a rosette, oblanceolate to oblong blunt, base round, doubly crenate glabrous, bullate above, prominently reticulate beneath, 3 in. long, 1 in. across. Scapes red-pubescent, 2 in. long, 3-flowered. Sepals linear red-pubescent. Corolla campanulate oblique, violet, sparsely pubescent, .3 in. long, .25 in. across the limb; lower lip longer. Stamens, filaments short, violet. Capsule narrow cylindric. *Hab.* Perak, Gunong Kerbau (Haniff). Very rare.

(55) *D. pumila* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 56.

Stems slender, woody, 1 to 3 in. long. Leaves crowded at top, elliptic-obovate blunt, base narrowed unequal, above silky pubescent, beneath dotted with swollen hair bases; nerves elevate, 6 pairs, beneath hairy; .5 to 1.5 in. long, .25 to 1 in. wide; petioles .25 to 1 in. long. Peduncles slender, 2 to 3 in. tall, purple white silky. Flowers 1 or 2, short-pedicelled. Bract linear, purple. Sepals linear purple pubescent. Corolla .25 in. long, tube short and broad pubescent, purplish white; lobes round, pinkish hardly bilabiate. Capsule .75 in. long, upcurved, minutely pubescent. *Hab.* Mountains at 3000 ft. altitude, local. Selangor, Semangkok Pass (Curtis, Burn-Murdoch).

(56) *D. grandiflora* Ridl. *Journ. F.M.S. Mus.* vi. 167.

Stem elongate, woody pubescent. Leaves opposite distant, equal oblanceolate or obovate, 1.2 in. long, blunt or cuspidate, base cuneate entire nearly quite glabrous, 1 to 2 in. long, .5 in. wide; petioles .5 in. long. Peduncle .25 in. long, glandular-hairy in a lower axil. Sepals lanceolate acuminate, glandular hairy. Corolla 2 in. long, tube glandular pubescent, trumpet-shaped, bilobed; limb 1 in. across, midlobe longer than the others, violet purple, an oblong 2-horned yellow patch in mouth, lobes purple. *Hab.* Very rare. By streams in forest, Pahang, Gunong Tahan, Wray's Camp, 3500 ft. altitude (Ridley).

DOUBTFUL SPECIES

D. PERAKENSIS Kranzl. *Notizbl. Kgl. Bot. Gart. Berlin*, 1907, 294.

From Perak, Gunong Hijau (Schlechter). I have not seen nor can make out from the description what this plant can be. Kranzlin gives it as of section *Didymanthus*, as he does his *D. Schlechteriana*, which is obviously *Parabœa cordata*, but does not seem certain that it is a *Didymocarpus* at all. The locality has been so well explored that it is highly improbable that the plant has not been previously described.

CHIRITA, Buch-Ham.

Herbs (or shrublets). Leaves opposite or whorled or alternate, lanceolate or ovate. Peduncles axillary, 1- or few-flowered. Bracts small or 0, or connate in a cup. Sepals narrow. Corolla funnel-shaped, 2-lipped, purple blue or white. Stamens 2, filaments filiform, anthers round connivent often hairy. Ovary cylindric; style long. Stigma ovate or oblong, usually bifid. Capsule long cylindric. Species about 30, India, China, Malaya.

Tall rough herb. Corolla hairy, claret colour . . . (1) *C. elata*

Slender weak herbs; corolla blue or white.

Bracts very small or 0.

Leaves ovate or ovate-lanceolate.

Corolla 1·5 in. long, azure blue . . . (2) *C. caliginosa*

Corolla 1 in. long, pale violet, plant hairy . . . (3) *C. parvula*

Corolla .75 in. long, dark violet. Plant subglabrous . . . (4) *C. viola*

Leaves lanceolate densely silky; flowers axillary . . . (5) *C. sericea*

Leaves oblanceolate sparse hairy; flower 1, terminal . . . (6) *C. uniflora*

Bracts large connate in a cup.

Corolla-tube .5 in. long . . . (7) *C. rupestris*

Corolla-tube 1 in. long . . . (8) *C. Glasgovii*

(1) *C. elata* Ridl. *Journ. Linn. Soc.* xxxii. 518; *Journ. As. Soc. S. Br.* 44, p. 57; *Journ. As. Soc. Beng., l.c.* 765.

A rough herb 2 ft. tall; stem 4-angled, branched. Leaves ovate acute, toothed inæquilateral, shortly rough hairy, 3 to 6 in. long, 1·5 to 3 in. wide; petioles slender, 1 in. long. Cymes axillary, 3 in. long, hairy. Sepals lanceolate hairy. Corolla funnel-shaped, hairy, 1 in. long, claret colour. Stigma bilobed. Capsule straight, cylindric. *Hab.* Mountain forests, local; Perak, Thaiping Hills (all collectors).

(2) *C. caliginosa* Clarke, *Mon. Phan.* v. 122; Ridl. *Journ. As. Soc. Beng., l.c.* 765.

A soft pubescent herb 1 ft. or more tall, often branched. Leaves opposite, ovate acuminate, base broad or cuneate, edges sub-entire pubescent, 2 to 5 in. long, 1 to 2·5 in. wide; petioles 1·5 in. long. Flowers 2 or more fascicled; peduncles 1 in. long, hairy. Bracts very small. Sepals lanceolate acuminate, .5 in. long, hairy. Corolla 1·5 in. long, azure blue, tube narrow at base, funnel-shaped at top; limb .75 in. across. Capsule slender, 3 in. long. *Hab.* Limestone rocks, Selangor, Batu Caves (all collectors). Perak, Kwala Dipang (Curtis); Batu Kurau (Scortechini); Lenggong (Ridley).

(3) *C. parvula* Ridl.

Small herb, 6 in. tall, sparsely short hairy all over. Leaves thin membranous, entire ovate-lanceolate, sub-acute, base decurrent, 3 in. long, 1·5 in. wide; petioles 1 in. long. Flowers solitary or paired axillary; pedicels 1 in. long. Calyx .4 in. long, lobes narrow lanceolate acuminate, hairy. Corolla light violet, tube cylindric,

·5 in. long, dilate above, limb bilabiate, ·4 in. wide. Capsule very narrow cylindric acuminate, 1·5 in. long. *Hab.* Pahang, Kota Tongkat, Benta-Kwantan road (Evans).

This resembles *C. viola*, but is hairy with longer sepals and long-tubed corolla.

(4) *C. viola* Ridl. *Journ. Linn. Soc.* xxxiii. 516; *Journ. Roy. As. Soc. S. Br.* 44, p. 59; *Journ. As. Soc. Beng.*, l.c. 765.

A weak herb 2 to 10 in. tall, pubescent. Leaves ovate acute, crenate serrate or entire, flaccid, base cuneate, 2 to 6 in. long, 1·5 to 3 in. wide; petioles ·12 to 1·75 in. long. Cymes axillary, few-flowered with slender branches; pedicels ·5 in. long, more or less. Sepals lanceolate-acute, hairy. Corolla ·75 in. long, tube narrow at base, trumpet-shaped, lower lip longer, midlobe longest, violet with darker streaks and a patch of yellow glandular hairs in throat. Stamens exsert. Capsule 1·5 in. long, pubescent. *Hab.* On rocks in forest, Pahang, Kwala Tekam (Seimund). Kedah, Gunong Geriang. Setul. Kelantan, Gunong near Kota Bharu (Ridley). Lankawi (Curtis).

This is often quite a small plant but grows also to over 1 ft. tall with a rather thick stem.

(5) *C. sericea* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 59; *Journ. As. Soc. Beng.*, l.c. 766.

Herb 3 to 12 in. tall, simple or branched, silky-woolly. Leaves opposite and alternate, lanceolate acuminate entire, base cuneate, densely shortly silky, 2 to 4 in. long, ·5 to 1·5 in. wide; petioles ·2 in. long. Flowers 1- to 3-fascicled axillary; pedicels ·5 in. long, silky. Bracts none. Sepals narrow lanceolate, silky, ·25 in. long. Corolla 1 in. long, pale blue (rarely white) hairy, lobes broad unequal. Capsule cylindric, silky hairy, 1·5 in. long. *Hab.* Limestone rocks, Perak, Ipoh (all collectors).

var. *Scortechinii* Ridl. Capsule shorter and thicker, ·5 in. long, ·125 in. through, splitting longitudinally in 2 valves. Corolla-tube straight, lobes of lower lip broad. *Hab.* Perak (Scortechini).

(6) *C. uniflora* Ridl. *Journ. Roy. As. Soc. S. Br.* 61, p. 34.

Stems several, rather woody slender, 15 in. tall. Leaves in pairs or above in whorls of 3, lanceolate or oblanceolate acuminate, base narrow, hairy, 2 in. long, 1 in. wide; petioles ·5 in. long. Flower solitary terminal on a slender hairy pedicel. Sepals linear acuminate hairy, ·1 in. long. Corolla-tube shorter, limb ·5 in. across, upper lobes short, lower longer, midlobe broad round, white with 3 violet streaks on a yellow patch on the lower lip. *Hab.* Selangor, Sempang Mines, Semangkok (Ridley).

(7) *C. rupestris* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 59; *Journ. As. Soc. Beng.*, l.c. 766; *Bot. Mag. t.* 8333.

A glabrescent herb, 4 to over 12 in. tall, simple or branched. Leaves opposite and alternate, thin ovate blunt, base broad

obscurely serrulate, 2.5 to 4 in. long, 1.75 to 2.75 in. wide; petioles 1.5 in. long. Flowers 1 or 2, enclosed in a green bilobed cup-shaped bract .5 in. long, hairy. Sepals narrow lanceolate hairy, nearly .5 in. long. Corolla as long as bract, hairy, blue, .5 in. long. Capsule slender, curved, 2.5 in. long. *Hab.* Lankawi (Curtis).

(8) **C. Glasgovii** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 59; *Journ. As. Soc. Beng., l.c.* 766.

A weak herb, 1 ft. tall, branched. Leaves ovate blunt, thin, sparsely hairy, 1 to 3 in. long, .75 to 2 in. wide; petioles 1 to 2 in. long, glabrous. Bract cup convolute, lobes ovate hairy, 1 in. long. Sepals lanceolate acuminate hairy, .5 in. long. Corolla 1 in. long, minutely hairy, dark violet. Capsule cylindric, curved, 3 in. long. *Hab.* Perak, Waterloo (Robertson-Glasgow).

6. LOXOCARPUS, Br.

Stemless herbs. Leaves crowded in a tuft, ovate or oblong pubescent. Flowers 1 or more in a crowded peduncled cyme, blue. Sepals free to base or nearly so. Corolla campanulate almost regular; lobes round. Stamens 2, filaments short, thick, sinuate; anthers large reniform. Style longer. Capsule follicular conic dehiscent along the upper edge. Species about 10, Malay Peninsula, Borneo.

Flowers 1 or 2; leaves ovate, base broad; nerves strongly elevate (1) **L. semitorta**

Flowers few; leaves lanceolate narrow (2) **L. angustifolia**

Flowers 1 to 3, very small; leaves oblong-lanceolate; capsule hardly longer than the calyx (3) **L. minima**

Flowers generally numerous on dichotomous cymes on a stout peduncle.

Peduncles 2 to 4 in. long; capsule ovoid (4) **L. incana**

Peduncles 6 to 12 in. long; capsule corniculate (5) **L. cœrulea**

(1) **L. semitorta** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 61; *Journ. As. Soc. Beng., l.c.* 768. *Didymocarpus semitortus* Clarke *Mon. Phan. v.* (1), 99.

Leaves thick, ovate or oblong blunt, base round, green silky above, beneath nerves thick red-woolly elevate, .3 to 1 in. long, .25 to .75 in. wide; petioles 1 to 2 in. long, thick-woolly. Scapes slender, 2 to 2.5 in. long with 1 or 2 flowers. Corolla .5 in. long, pale blue, violet streaked in throat; anthers purple. Capsule .25 in. long, horn-shaped. *Hab.* Very local. "The Mt. Ophir Violet." On rocks at 4000 ft. altitude. Malacca, Mt. Ophir on rocks in the stream (all collectors).

(2) **L. angustifolia** Ridl. *Journ. Linn. Soc.* xxxviii. 319.

A very small plant. Leaves narrow lanceolate, acute, base narrowed to petiole, silky, .75 to 2 in. long, .25 to .5 in. wide. Peduncles very slender silky, 2 in. long, 2- or 3-flowered. Corolla .3 to .5 in. long, lower lip a little longer, violet. Capsule horn-shaped, viscid hairy. *Hab.* On rocks in stream. Very local.

Pahang, on Gunong Tahan at the junction of the Teku and Camp Stream (Ridley). *Distrib.* Lingga.

(3) **L. minima** Ridl. *Journ. Roy. As. Soc. S. Br.* 86, p. 302.

Small stemless herb densely silky all over except the corolla. Leaves ovate to oblong-lanceolate, .5 to .75 in. long, .2 to .25 in. wide; petioles .5 in. long or less. Peduncle slender, 1.5 in. long with 1 to 3 flowers at the top. Pedicels .1 in. long. Bracts small linear. Sepals lanceolate, .1 in. long. Corolla little longer, campanulate sub-regular, hairy outside, light violet blue. Capsule ovoid, eventually splitting along the upper edge, hardly longer than the calyx. Seeds oblong acute reticulate. *Hab.* On large rocks at the head of a stream, in thick forest, Negri Sembilan, Bukit Tangga (Ridley).

(4) **L. incana** R. Br. *Benn. Pl. Jav. Rar.* 120; *Ridl. Journ. As. Soc. Beng., l.c.* 769.

Leaves ovate serrulate sub-acute, or blunt, base round cordate, silky-tomentose all over, 1 to 3 in. long and as wide; petioles .75 to 1 in. long. Peduncles 2 to 6 in. long, stout, viscid hairy. Cymes large, 3 in. long, dichotomous or small condensed. Flowers often numerous. Sepals lanceolate hairy, white tinged green. Corolla-lobes oblong, lower longer, blue. Filaments straight. Capsule ovoid viscid hairy. *Hab.* On rocks in mountain forests, Selangor, Bukit Kutu. Perak, Hermitage Hill (Ridley). Penang Hill (all collectors). Rahman, Bukit Sembilan, Kota Bharu (Gwynne-Vaughan).

(5) **L. cærulea** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 62; *Journ. As. Soc. Beng., l.c.* 769.

Leaves ovate, base rounded cordate, often unequal, serrulate, thinly appressed, silky above, red-hairy beneath, 2 to 6 in. long, 1.5 to 4 in. wide; petioles 2 to 8 in. long. Peduncles 6 to 12 in. long, viscid-hairy with 1 or 2 short branches. Sepals lanceolate, short. Corolla pubescent, 2-lipped, .4 in. long and wide, lower lobes truncate, middle one longer, blue, mouth violet. Capsule .4 to .5 in. long, horn-shaped acute, viscid. *Hab.* Mountains on rocks. Pahang, Gunong Tahan. Selangor, Bukit Hitam (Kelsall). Perak, Thaiping Hills (all collectors); Gunong Bubu (Wray); Kedah, Gunong Bintang (Kloss).

7. PARABCEA, Ridl.

Herbs with rosulate leaves or shrublets with distant pairs of leaves. Flowers small white or pink rarely blue, in paniced cymes peduncled. Calyx small. Corolla campanulate or often with a very short tube and larger 2-lipped or nearly regular limb. Stamens 2, filaments very short, thick; anthers large, 2-celled connivent. Ovary sessile; style much longer than stamens, stout; stigma small, capitate. Capsule narrow, straight, cylindric. Species about 25, Siam to Malaya.

i. CAMPANULATÆ. Corolla campanulate.

Corolla 5 in. long.

Tall herb; leaves in distant pairs; panicles large

(1) *P. cordata*

Flowers solitary or few; panicles sub-terminal.

Leaves hairy on edge and nerves; peduncles 1-flowered

(2) *P. campanulata*

Leaves glabrous; peduncles branched; branches 1-flowered

(3) *P. Scortechinii*

Peduncles axillary; leaves crowded at top; flowers blue

(4) *P. cærulea*

Corolla under 5 in. long; flowers few, crowded at top

(5) *P. pyroliflora*

Dwarf plants; leaves crowded at the top of stem.

Leaves oblanceolate

(6) *P. rubiginosa*

Leaves narrow lanceolate, villous

(7) *P. tiumanica*

Leaves numerous crowded at top, oblong-lanceolate or linear narrow, serrate glabrous.

Flowers 125 in. long, pink; leaves very narrow lanceolate

(8) *P. salicina*

Flowers small, white; leaves oblong-linear

(9) *P. filicifolia*

Corolla not known; stemless with leaves 9 in. long, 35 in. wide

(10) *P. grandifolia*

ii. EU-PARABÆA. Corolla-tube very short; limb sometimes regular much wider explanate; flowers white.

Corolla-lobes equal or sub-equal or lower lip hardly longer than upper.

Flowers in compact umbels or cymes; pedicels 15 in. long or less.

Stemless leaves not purple beneath.

Flowers umbellate; leaves ochreous beneath

(11) *P. capitata*

Flowers in scorpioid cymes; leaves not ochreous

(12) *P. ferruginea*

A short stem. Leaves purple beneath; flowers umbellate; cymes with branches

1 to 3 in. long

(13) *P. regularis*

Leaves ochreous tomentose beneath, stem 0

(14) *P. polita*

Leaves red woolly beneath; stem 2 in. long

(15) *P. vulpina*

Corolla-lobes unequal, lower lip longer.

Sepals lanceolate; leaves obovate, toothed

(16) *P. laxa*

Sepals oblong or linear.

Leaves oblong-elliptic, sparse hairy; corolla 5 in. wide

(17) *P. Curtisii*

Leaves obovate, arachnoid both sides; corolla 25 in. long

(18) *P. obovata*

(1) *P. cordata* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 64; *Journ. As. Soc. Beng., l.c.* 771. *Didymocarpus cordata* Jack, *R. Br. Benn. Pl. Jav. Rar.* 119; *D. Schlechteriana* Kranzl. *Notizbl. Kgl. Bot. Gart. Berlin*, 1907, p. 393.

A herb about 2 ft. tall, pubescent or hairy. Leaves ovate

acuminate, base blunt unequal, edge serrate, sparingly to densely tomentose-hairy all over, 6 to 7 in. long, 4 in. wide; petioles 1 in. long. Peduncles 6 to 8 in. long, hairy or pubescent with a slender branched glabrous panicle 3 in. long and as wide, lax. Bracts in pairs. Sepals free, glabrous, .1 in. long. Corolla campanulate, .5 in. long, white tinted with violet or rose, lobes short, sub-equal rounded, glandular. Filaments very short. Capsule sausage-shaped, 4-angled, 1.5 in. long. *Hab.* Mountain woods at 2000 to 3000 ft. altitude. Perak, Thaiping Hills (all collectors); Sira Rimau, base of Gunong Inas (Yapp). Penang Hill (Wallich and all collectors).

var. *debilis* Ridl., l.c. Rhizome fleshy; stem 6 in. tall. Leaves 1.5 to 4 in. long, by 1 to 2 in. wide. Panicle 4 to 6 in. long, weak; branches few and thin and flowers smaller. *Hab.* Kedah Peak (Ridley).

var. *ophirensis* Ridl. Tall and weak. Leaves lanceolate acute narrowed to base, 6 in. long, 2 in. wide. Flowers and capsules smaller. *Hab.* Malacca, Mt. Ophir on a cliff below Padang Batu (Ridley).

(2) **P. campanulata** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 65. Stem slender, 1 ft. tall, hairy. Leaves in distant pairs, elliptic acute, obscurely crenulate, glabrous except edge and elevated nerves beneath, scurfy-hairy, 2.5 to 3.5 in. long, 1.25 in. wide; petioles scurfy-hairy, .12 to .3 in. long. Peduncles 1.5 in. long, 1-flowered, red-hairy. Bracts alternate, minute. Sepals linear, hairy. Corolla campanulate, white, lobes broad, round. Capsule velvety, .75 in. long. *Hab.* Selangor, Semangkok Pass, Sempang Mines 3000 to 4000 ft. altitude (Curtis, one specimen).

(3) **P. Scortechinii** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 66; *Journ. As. Soc. Beng., l.c.* 772.

Glabrous. Leaves ovate-acuminate; base round, unequal crenate, 3 to 3.5 in. long, 1 to 2.5 in. wide; petioles .5 in. long. Panicle 3 in. long; branches dichotomous, few, 1 in. long; flowers solitary on branch-ends. Sepals oblong obtuse. Corolla campanulate, .5 in. long. *Hab.* Perak (Scortechini). Very little known.

(4) **P. cœrulea** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 66; *Journ. As. Soc. Beng., l.c.* 772.

Stem woody, 3 to 4 in. long, silvery hairy above. Leaves crowded at top, narrow lanceolate-linear acuminate, narrowed gradually to base, dark green above, pale cinnamon beneath; nerves 30 pairs. Peduncles axillary, 4 in. long, pubescent, 1- to 2-flowered. Sepals linear, blunt. Corolla campanulate, .5 in. long and nearly as wide at base; lobes deep blue. Capsule very narrow, cylindric, 1 in. long. *Hab.* Tringganu, Bundi (Rostados). Very rare.

(5) **P. pyroliflora** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 67; *Journ. As. Soc. Beng., l.c.* 772. *Didymocarpus pyroliflora* Ridl. *Trans. Linn. Soc.* iii. 330.

Woody, 3 to 6 in. tall or more, bare below. Leaves alternate,

ovate or ovate-lanceolate, acuminate at both ends, 3 to 4 in. long, 1.5 in. wide, entire; silky pubescent all over; petioles over 1 in. long. Peduncles from upper axils 3 to 4 in. long, hairy. Sepals lanceolate, pubescent. Corolla funnel-shaped, campanulate, white, .4 in. long, lobes short round. Style longer than corolla. Capsule 1 in. long, terete. *Hab.* Local on river banks and rocks, Pahang, Tahan River woods (Ridley).

(6) *P. rubiginosa* Ridl. *Journ. Linn. Soc.* xxxviii. 319.

Root thick, woody as much as 6 in. long; stem woody, 1 in. long, red-tomentose. Leaves rosulate or opposite or alternate, oblanceolate, rather thick, narrowed to the rounded base, velvety hairy, dark green above, red-hairy beneath, 1.5 to 2 in. long, 1 in. across; nerves strongly eleviate beneath; petioles short thick or 0. Peduncles 6 to 8 in. long, red-pubescent. Panicle branches few. Sepals linear short. Corolla campanulate, white tinted rose-colour, .25 in. long. Capsule linear acuminate, .75 in. long. *Hab.* Pahang, Gunong Tahan, on rocks 4000 to 5000 ft. altitude (Ridley).

(7) *P. tiumanica* Burkill, MSS.

Stem 3 in. tall, white villous above. Leaves narrow oblong-lanceolate, thin, serrulate villous with pale hairs all over, base cuneate, 3 in. long, .5 in. wide; petioles slender, 1 in. long, villous. Peduncles 1.5 in. long, villous, 1-flowered. Sepals lanceolate. Corolla .5 in. long, widely campanulate, tube thick. Filaments short, terete; anthers large, connate. Style longer than stamens half as long as corolla, pubescent. Capsule rather short, curved acuminate. *Hab.* Pulau Tiuman, west of Juara Bay (Burkill).

(8) *P. salicina* Ridl. *Didymocarpus salicina* Ridl. *Trans. Linn. Soc.* iii. 329.

Stem slender, woody, 3 to 6 in. tall. Leaves opposite, narrow lanceolate acuminate, glabrous, closely serrate, pale green above, reddish beneath, 3 to 4 in. long, 1.5 in. wide; petioles slender, 1.5 in. long. Peduncles numerous in upper axils very slender, red, 2 in. long. Flowers pink, .125 in. long. Sepals linear pubescent. Corolla campanulate, lobes ovate acute. Filaments short, anthers reniform. Style longer than corolla. Capsule .75 in. long. *Hab.* Rocky stream banks in forests, Pahang, Tahan River up to Kwala Teku and on to base of Tahan range (Ridley).

I take this to be more nearly allied to *Parabœa* than to *Didymocarpus*.

(9) *P. filicifolia* Ridl. *Journ. F.M.S. Mus.* vi. 166.

Stem woody, 3 to 4 in. long. Leaves oblong-linear acuminate, base narrowed blunt decurrent on petiole, edges closely serrate, dark green, whitish beneath, glabrous, 3.5 to 5.5 in. long, .5 in. wide; petioles .12 in. long. Peduncles red-scurfy, 1.5 to 2 in. long; flowers 2 to 4. Bracts linear acuminate. Sepals narrow linear acute. Corolla short, campanulate, lobes ovate acute,

white. Capsule .5 in. long. *Hab.* Pahang, damp banks of streams on Gunong Tahan at 5000 ft. altitude (Ridley).

(10) **P. grandifolia** Ridl. *Didymocarpus grandifolia* Ridl. *Journ. Linn. Soc.* xxxviii. 318.

Stemless with thick woody root. Leaves oblanceolate acute decurrent on petiole, crenulate, glabrous except pubescent nerves beneath, 17 pairs; 9 in. long, 3.5 in. wide. Peduncles stout, 8 to 9 in. long, pubescent, with few short 1 in. long branches. Sepals .25 in. long, lanceolate acuminate hairy. Flowers unknown. Capsule glabrous, 3 in. long. *Hab.* Pahang, Gunong Tahan 3300 ft. altitude (Robinson). Very rare.

This, of which the flowers are quite unknown, is probably from its habit a *Parabœa*.

(11) **P. capitata** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 67; *Journ. As. Soc. Beng., l.c.* 773.

Stemless on a stout rhizome. Leaves orbicular, base round, sub-peltate, dentate glabrous above, ochre yellow tomentose beneath; nerves and reticulations raised, 6 in. long, 5 in. wide; petioles 2 to 3 in. long. Peduncles 8 in. tall; flowers numerous umbelled at top with 2 broad bracts below, .25 in. long; pedicels .25 in. long. Sepals oblong blunt, pubescent green. Corolla .5 in. across, lobes sub-equal round, white. Style longer than corolla. Capsule linear beaked, 1.5 in. long. *Hab.* Limestone rocks, Selangor, Kamuning. Perak, Bujong Malacca (Curtis); Sungei Rayah (Kunstler).

var. *oblongifolia* Ridl. (*oblongiflora* by misprint in *Journ. As. Soc. Beng., l.c.* 773). Leaves oblong or oblanceolate narrowed gradually to base beneath and on peduncle. *Hab.* Perak, Kwala Dipang; Sungei Siput (Curtis); Tambun; Batu Kurau (Scortechini); Goping (Kunstler).

(12) **P. ferruginea** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 68; *Journ. As. Soc. Beng., l.c.* 773.

Nearly stemless. Leaves in a rosette, ovate-cordate blunt crenulate, above sparsely hairy, beneath tomentose, hairs longer, nerves elevate; 3 in. long, 2.5 in. wide; petioles 1.5 to 2 in. long. Peduncles 3 in. long, ferruginous tomentose; cyme compact, scorpioid, red-hispid. Sepals as long as corolla, green red-hispid lanceolate. Corolla not 2-lipped, tube short, limb expanded white or tinted rose. Filaments thick, spathulate. *Hab.* Lankawi, Damp rocks (Curtis).

(13) **P. regularis** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 68; *Journ. As. Soc. Beng., l.c.* 773.

Stem woody, 1.5 in. long. Leaves crowded at top, very unequal, oblong-lanceolate, blunt base cuneate inæquilateral, crenulate, green glabrous above, purple minutely tomentose beneath, nerves elevate; 3 in. long, 1.5 in. wide; petioles 1.5 in. long.

Peduncles slender pubescent, .1 in. long. Cyme branches short, slender, .25 in. long, umbelled, brown-tomentose; flowers few, very small. Sepals lanceolate brown-tomentose, as long as corolla-tube. Corolla hardly .25 in. across, white, lobes oblong blunt, equal, not 2-lipped. Filaments thick sigmoid. Capsule .5 in. long, cylindric. *Hab.* Lankawi islands (Curtis).

(14) ***P. polita*** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 69; *Journ. As. Soc. Beng., l.c.* 774.

Stemless. Leaves in a rosette, ovate blunt crenate, base round, deep green above, ochreous tomentose beneath, nerves and nervules elevate; 8 in. long, 4 to 4.5 in. wide; petioles 4 in. long. Peduncle over 1 ft. long, brown-ochreous furred. Cyme branches few umbellate; pedicels .25 in. long. Sepals linear. Corolla sub-bilobed, .5 in. across, white, back tinted pink. *Hab.* Rocks, Hill forests. Perak, Bujong Malacca (Curtis).

This is perhaps a hybrid between *P. capitata* and *P. vulpina*.

(15) ***P. vulpina*** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 69; *Journ. As. Soc. Beng., l.c.* 774.

Stem 2 in. long, thick, covered with red wool. Leaves elliptic rounded at each end, crenulate, above sprinkled with pale hairs, beneath densely rufous-hairy; nerves strongly elevate; 1.5 to 3 in. long, 1 to 3 in. wide; petioles 1 to 3 in. long, dense red-woolly. Peduncles slender, 6 to 8 in. long, red. Cyme branches few, slender, 1 to 3 in. long; bracts very small. Sepals linear, glabrous. Corolla white, .25 in. across, lobes rounded, sub-equal. Capsule cylindric, glabrous. *Hab.* Limestone rocks. Perak, Bujong Malacca; Ipoh Hot Springs (Curtis).

(16) ***P. laxa*** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 70; *Journ. As. Soc. Beng., l.c.* 774.

Stem very short woody, thickly brown-tomentose. Leaves obovate or oblong, sessile coarsely doubly crenate-serrate densely long white-silky above, brown silky-hairy villous beneath, 3 to 7 in. long, 2 to 3 in. wide. Peduncles glabrous, slender, 5 to 6 in. long, terminated by a lax much-branched umbellate panicle 3 in. long and wide. Sepals very small, lanceolate. Corolla .125 in. across, white or rose-tinted, upper lobes broad, lower lip trifid, central lobe broadest. Capsule slender, cylindric, .5 in. long. *Hab.* Lankawi, very abundant on cliffs of small islands opposite Kwah (Curtis).

(17) ***P. curtisii*** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 70; *Journ. As. Soc. Br., l.c.* 775.

Stemless. Leaves oblong-elliptic blunt, crenate, 6 in. long, 2.5 in. wide, above sprinkled with hairs; petioles red-hairy, 1.5 in. long. Scapes 10 in. long, red-tomentose; branches 4 to 5, umbelled at top, 2 in. long; pedicels red-tomentose. Sepals linear hairy. Corolla .5 in. across, white; buds tinted pink; limb

bilobed, lower lobe larger. Capsule cylindric. *Hab.* Perak, Bujong Malacca (Curtis).

(18) *P. obovata* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 71; *Journ. As. Soc. Beng., l.c.* 775.

Stem short. Leaves crowded at the top, thin obovate, blunt; base cuneate, thinly arachnoid on both sides, yellowish beneath, 3 in. long, 1.5 in. wide; petioles .25 in. long. Peduncle slender, 3 to 6 in. long, glabrous; branches few, terminal. Sepals oblong, blunt. Corolla .25 in. across, lower lip longer than upper one, lobes oblong, rounded. *Hab.* Lankawi, Gunong Chinchang (Curtis).

8. CODONOBÆA, Ridl.

Shrublets. Leaves opposite or alternate, lanceolate, petioled; petiole channelled with peduncle rising from axil of petiole or adnate and enclosed in it. Peduncle short; pedicels short. Flowers medium or small. Calyx-lobes linear. Corolla gibbous broad, campanulate; lobes very short, tooth-like. Stamens 2, very short; filaments thick. Style much longer, all enclosed in corolla-tube. Capsule slender, cylindric. Species 3, Pahang.

Leaves opposite sub-equal; peduncle tall erect, free from petiole

(1) *C. leucocodon*

Leaves opposite unequal, glabrous; peduncle enclosed in the petiole

(2) *C. ericæflora*

Leaves alternate, thin hairy; peduncle enclosed in the petiole; flowers very small

(3) *C. lilacina*

(1) *C. leucocodon* Ridl. *Parabœa leucocodon* Ridl. *Journ. F.M.S. Mus.* vi. 167.

Stem stout, 8 to 12 in. tall; young parts hairy. Leaves numerous on branch ends, oblanceolate, base narrowed, sub-acute fleshy, glabrous above, hairy beneath, 5.5 in. long, 2 in. wide; petioles channelled, .5 in. long. Peduncles hairy erect in axils, 2.5 to 3 in. long. Sepals lanceolate acuminate, hairy. Corolla campanulate pubescent, pure white, rarely violet, 1 in. long, lobes ovate blunt equal. Capsule .75 in. long. *Hab.* Damp woods at 4000 to 5500 ft. altitude. Pahang, Gunong Tahan (Ridley).

(2) *C. ericæflora* Ridl. *Didymocarpus ericæflora* Ridl. *Journ. F.M.S. Mus.* vi. 166.

Stem over 1 ft. tall, woody, pale, entirely glabrous. Leaves narrow lanceolate long-acuminate, base narrowed, in distant unequal pairs; nerves very inconspicuous, midrib thick; 6 in. long, 1 in. wide; petioles .4 in. long. Bracts linear, 2. Peduncles adnate to the petioles, .12 in. long; pedicels slender, scurfy. Flowers in pairs. Sepals free, linear blunt. Corolla .25 in. long, thick tubular gibbous at base, white, lobes very short, .08 in. long, blunt, violet. Stamens very short straight. Capsule 1 in. long. *Hab.* Pahang, Gunong Tahan at 3500 ft. altitude, Wray's Camp, rare (Ridley).

(3) *C. lilacina* Ridl. *Didymocarpus lilacina* Ridl. *Trans. Linn. Soc.* iii. 330; *Journ. As. Soc. Beng., l.c.* 764.

Stems 12 to 15 in. long, brown-pubescent. Leaves distant alternate, lanceolate crenate-dentate pubescent, 4 in. long, 1 in. wide; petioles 1 in. long. Pedicels adnate to petioles up to leaf blade, slender, .25 in. long; branches short, slender. Sepals lanceolate hispid. Corolla campanulate pubescent, rosy violet, .1 in. long, lobes oblong rounded. Capsule .65 in. long, rather thick. *Hab.* Pahang, banks of Tahan River, local (Ridley). Kelantan, Kwala Aring (Yapp).

9. *BCEA*, Commers.

Shrublets or herbaceous plants generally very woolly with felted wool on the under-side of leaves. Leaves opposite or rosulate, lanceolate or oblanceolate. Flowers panicled in a terminal or axillary panicle. Calyx-tube short or 0, lobes linear or broad. Corolla-tube very short, limb explanate, more or less 2-lipped, blue, white or rose. Stamens 2, filaments very short and thick; anthers broad oblong connivent, yellow. Style longer than corolla. Capsule cylindric or fusiform, spirally twisted. Species about 20, Burma, China, New Guinea, Solomon isles and Malay peninsula.

Leaves crowded at the base on a stout root-stock;
above them a tall panicled stem.

Flowers 1.5 in. across, bright blue (1) *B. paniculata*

Flowers pale blue, .25 in. across; panicle wide
spreading (2) *B. divaricata*

Flowers pink; panicle short, whole plant very
woolly (3) *B. lanata*

Stems 2 ft. or more tall; leaves above opposite;
flowers blue, .5 to .75 in. wide.

Leaves thinly white tomentose beneath (4) *B. verticillata*

Leaves brownish woolly beneath (5) *B. cærulescens*

Stems 6 in. below the leaves, slender woody, much-
branched; corolla white (6) *B. suffruticosa*

Stems simple or nearly so.

Calyx pubescent.

Leaves large oblanceolate, cinnamon beneath (7) *B. acutifolia*

Leaves narrow lanceolate, white beneath (8) *B. lancifolia*

Calyx glabrous; leaves arachnoid above; flowers
.5 in. across (9) *B. elegans*

Calyx glabrous; leaves glabrous above; flowers
under .2 in. wide (10) *B. parviflora*

Calyx glabrous; leaves soft, white hairy on edge
and nerves; flowers .15 in. wide (11) *B. minutiflora*

(1) *B. paniculata* Ridl. *Journ. Linn. Soc.* xxxii. 519; *Journ. As. Soc. Beng., l.c.* 776.

Rootstock woody, 4 in. long, .5 in. thick. Stem 1 ft. or more tall, stout, grooved, white arachnoid with many whorled branches. Leaves in a rosette at base, lanceolate acuminate, long narrowed

to base, above grey arachnoid, beneath white-tomentose, 6 in. long, 1 in. wide. Flowers numerous. Sepals short pubescent. Corolla-tube very short; limb 1.5 in. across, lobes round unequal, bright blue. Capsule .75 in. long, thick. *Hab.* Limestone cliffs. Selangor, Batu Caves. Perak, Sungei Siput (Curtis); Kwala Dipang (Kunstler); Batu Kurau (Scortechini).

(2) **B. divaricata** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 75; *Journ. As. Soc. Beng., l.c.* 778.

Rootstock woody stout, 4 in. long. Leaves in a rosette oblanceolate blunt or sub-acute, crenulate, widely winged to base of petiole, glabrous above, thinly cinnamon arachnoid beneath, 7 in. long, 2.5 in. wide; nerves and midrib prominent. Panicle 12 in. or more long on a peduncle 7 to 16 in. long, lax decompound, very many flowered, brown-tomentose. Sepals lanceolate acute very small. Corolla .25 in. across, pale lilac or blue, 2-lipped. Capsule cylindric, 1 in. long. *Hab.* Lankawi, Ayer Hangat (Curtis).

(3) **B. lanata** Ridl. *Journ. Linn. Soc.* xxxii. 520; *Journ. As. Soc. Beng., l.c.* 777.

Rootstock 2 in. long, covered like the leaves with close white felted wool. Leaves crowded, lanceolate acuminate, winged to base, silvery white, 3 to 6 in. long (including winged petiole), .75 in. across. Peduncles woolly, 3 to 5 in. long. Panicles dense, crowded, 1 in. long, spreading in fruit. Sepals lanceolate woolly. Corolla .75 in. across, rose-pink. Capsule fusiform, .5 in. long. *Hab.* On bare limestone rocks. Lankawi, Dayong Bunting (Curtis).

(4) **B. verticillata** Ridl. *Journ. Linn. Soc.* xxxii. 519; *Journ. As. Soc. Beng., l.c.* 776.

Rootstock woody, 3 in. long; stem above 1.5 ft. tall, white woolly, 4-angled. Leaves in distant whorls, lanceolate acuminate, narrowed at base, 4 to 6 in. long, .75 to 1.5 in. wide, grey tomentose above, white beneath; nerves over 20 pairs prominent beneath. Panicle branches whorled, 1 to 2 in. long, bracts leafy. Sepals arachnoid. Corolla .5 in. across, blue. Capsule fusiform, .5 in. long. *Hab.* Limestone cliffs, Selangor, Batu Caves (Ridley, Kelsall).

(5) **B. cærulescens** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 73; *Journ. As. Soc. Beng., l.c.* 777.

Whole plant 2 to 3 ft. tall. Stem 4-angled, grooved woolly. Leaves whorled oblanceolate acute or subobtuse, dark green, pubescent above, ochreous woolly beneath, 6 to 8 in. long, 1.25 to 2 in. wide; petioles winged to base or not, 1 in. long. Panicle 2 ft. long of lax whorled branches 3 in. long or less, yellow woolly. Sepals lanceolate woolly. Corolla-limb .75 in. across, pale blue, upper lip shorter than the unequal lobed lower lip. Capsule cylindric, thick, .75 in. long. *Hab.* Limestone rocks, Perak, Sungei Siput (Curtis); Kwala Dipang (Kunstler).

(6) **B. suffruticosa** Ridl. *Journ. Linn. Soc.* xxxii. 518; *Journ. As. Soc. Beng.*, l.c. 778.

A branching shrub, 1 to 2 ft. tall; branches slender, spreading slightly arachnoid. Leaves paired, lanceolate, sub-acute, base narrowed, nearly glabrous above, brownish-tomentose beneath, 3 in. long, .5 in. wide; petioles slender, .25 to .5 in. long. Panicles axillary, dense, 1 in. long; branches short, brownish-woolly. Sepals linear-lanceolate longer than corolla-tube. Corolla .25 to .35 in. across, white. Capsule thick short, fusiform, .25 in. long. *Hab.* On rocks. Lankawi, small islands north of Kwah (Curtis).

(7) **B. acutifolia** Ridl. *Journ. Linn. Soc.* xxxii. 519; *Journ. As. Soc. Beng.*, l.c. 778.

Stem woody, yellowish-tomentose, 4 to 6 in. long with short .2 in. long internodes. Leaves opposite in upper part lanceolate acuminate acute narrowed to base and decurrent on petiole, above glabrous, beneath cinnamon-tomentose, 6 in. long, 1.5 in. wide. Peduncles axillary, slender, 3 in. long in flower, 6 in. in fruit, tomentose; branches few, short. Calyx tubular, teeth lanceolate acute, glabrous at length. Corolla small. Capsule cylindric acute, .75 in. long. *Hab.* Lankawi, Goa Chirita (Curtis); Pulau Ledi (Haniff).

(8) **B. lancifolia** Ridl.

Stem slender woody. Leaves narrow lanceolate acute, base long-acuminate, above white arachnoid, beneath white woolly; nerves 10 pairs, elevate beneath; 2 to 3 in. long, .36 in. wide; petioles .5 in. long. Panicle 4 in. long; branches .75 in. long or less, many-flowered, all felted woolly; lower bracts leafy, upper linear, .25 in. long. Pedicels very short. Sepals linear-oblong woolly longer than corolla. Corolla-tube .25 in. long, limb .5 in. across. Stamen-filaments very short; anthers large oblong. Style longer than corolla. *Hab.* Lankawi, Terutau (Curtis).

(9) **B. elegans** Ridl. *Journ. Linn. Soc.* xxxii. 522; *Journ. As. Soc. Beng.*, l.c. 777.

Stem woody, decumbent, 6 in. long, above 4-angled, white-tomentose. Leaves whorled in threes, lanceolate acute, narrowed to base sessile, grey tomentose above, white or cinnamon beneath, 1 to 2.5 in. long, .25 to .5 in. wide. Peduncles from upper axils slender, glabrous, 6 to 12 in. long (in fruit) with few long slender spreading branches; cyme 3 in. long in flower, 5 in. long in fruit. Sepals lanceolate, glabrous. Corolla .5 in. across, lobes round, pink. *Hab.* On granite precipices, Kedah Peak at 3000 ft. altitude (Ridley).

(10) **B. parviflora** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 76; *Journ. As. Soc. Beng.*, l.c. 778.

Stem 5 to 6 in. long, slender, simple or branched, reddish-tomentose. Leaves paired distant lanceolate acuminate, base narrowed, above glabrous, beneath rusty woolly, 4 in. long, 1 to 1.25 in. wide; petioles rather stout, .5 in. long. Peduncles very

slender, 6 in. long or less. Panicle umbellate; branches very slender, lax, 3 in. long and wide. Flowers numerous, small, white. Sepals lanceolate, glabrous. Corolla .15 in. across, white. Capsule very slender, cylindric, .25 in. long. *Hab.* Limestone rocks, Perak, hot springs near Ipoh and Sungei Siput (Curtis); Kinta (Kunstler).

(11) **B. minutiflora** Ridl.

Stem 3 to 4 in. tall, densely softly white-hairy. Leaves thin membranous ovate or ovate-lanceolate, blunt acuminate, base decurrent, edges coarsely serrate, sparsely hairy with long soft hairs on both sides; nerves and edges densely hairy, 5 in. long, 4 in. wide; petioles 1.5 in. long, densely soft hairy. Panicles lax spreading. Peduncles 3 in. long, hairy. Cyme branches numerous, very slender, about 1 in. long. Pedicels longer than flower. Calyx and lobes linear-lanceolate as long as corolla-tube. Corolla white, .08 in. long, tube very short, limb unequally bilobed. Stamens 2, anthers large ellipsoid. Style longer than corolla. Ovary ovoid. Capsule .15 in. long, acute, spirally twisted. *Hab.* Pahang, Gunong Senyum (Evans).

10. DICHIOBCEA, Stapf.

Tomentose half shrubby herbs with opposite leaves and axillary and terminal cymes. Calyx 2-lipped, upper lip entire, lower lip of 2 linear lobes. Corolla widely campanulate, oblique, lobes rounded, short, sub-equal. Stamens 2 from base of corolla; filaments filiform, short. Ovary lanceolate; style curved. Capsule spirally twisted, narrowed upwards. Species 2, 1 Burmese.

(1) **D. speciosa** Stapf. *Kew Bulletin*, 1913, p. 356. *Phyllobœa speciosa* Ridl. *Journ. Linn. Soc.* xxxii. 522; *Journ. As. Soc. Beng.*, l.c. 780.

A white tomentose shrub 1 to 2 ft. tall. Leaves in distant pairs lanceolate acuminate narrowed to base, above glabrous, beneath white arachnoid, 6 in. long, 1 in. across; petioles 1 in. long. Panicles axillary and terminal up to 4 in. long, with leafy bracts. Flowers fairly numerous. Calyx white*woolly, lobes ovate-lanceolate. Corolla 1 in. across, blue. Capsule 1 in. long, lanceolate thick. *Hab.* Lankawi, Pulau Tanjong Siri and other small islands (Curtis).

11. BŒICA, Clarke.

Herbs or half shrubby plants with the habit of *Bœa*, but with 4 stamens in a circle, and an untwisted capsule. Corolla-lobes sub-equal, lilac, white or blue; tube very short. Stamens 4, filaments very short. Style curved longer. Capsule linear-cylindric. Species 4 or 5, Burma and Malay Peninsula.

Stemless with leaves in a rosette.

Leaves obovate, serrate; scapes few-flowered;
flowers lilac

(1) **B. brachyandra**

Leaves ovate crenulate; scapes 1-flowered, pale
blue

(2) **B. nutans**

(1) **B. brachyandra** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 78; *Journ. As. Soc. Beng., l.c.* 781.

Stemless. Leaves obovate serrate, blunt, base round, hairy, 3 in. long, 1.5 in. wide; nerves and edge long hairy. Scapes short few-flowered, 3 in. long, hairy. Sepals linear free nearly to base, hairy, nearly as long as corolla-lobes. Corolla-tube short; lobes broad, rounded, .5 in. across, pale lilac. Stamens 4, filaments very short; anthers connivent round pistil. Style longer. Capsule cylindrical, 1 in. long on pedicel .5 in. long. *Hab.* Lankawi, Gunong Chinchang; Kwala Malacca (Curtis).

(2) **B. nutans** Ridl. *Journ. Roy. As. Soc. S. Br.* 61, p. 34.

Stemless. Leaves rosulate ovate, rounded at both ends, crenulate hairy, 4 in. long, 3 in. wide; petioles .25 in. long, hairy. Peduncles numerous, 1 to 1.5 in. long, 1-flowered. Flowers nodding. Sepals lanceolate acute, hairy. Corolla regular, .5 in. across, violet blue, lobes oblong-ovate, rounded, equal. Stamens 4, anthers elliptic, sessile with a thick yellow connective. Ovary pubescent. Stigma orbicular. *Hab.* Perak, Gunong Kerbau (Haniff).

There are two forms, one with green leaves, and one with olive green leaves with purple hairs.

12. ORCHADOCARPA, Ridl.

Herb with woody rootstock. Leaves opposite, unequal, membranous, ovate, base inæquilateral, serrate, hairy. Flowers small cymose or racemose on a peduncle. Sepals free to base, lanceolate. Corolla-tube short, limb unequally 2-lipped. Stamens 2, exsert; filaments sinuous, short; anthers bilobed, reniform, connivent. Ovary hairy, oblong; style short; stigma capitate. Capsule oblong hairy. Species 1.

(1) **O. lilacina** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 78; *Journ. As. Soc. Beng., l.c.* 781.

Rootstock up to 4 in. long. Leaves ovate or ovate-lanceolate, closely hairy, 3 to 7 in. long, 1.5 to 3 in. wide; petioles slender, 3 to 6 in. long. Peduncles 3 to 4 in. long, villous; cyme-branches about 1.5 in. long. Corolla .75 in. across, lilac-blue, lobes broad, rounded, lower lip much longer than upper. Capsule shorter than sepals, oblong, beaked. *Hab.* Mountains about 4500 ft. altitude. Selangor, Gunong Mengkuang Lebah (Robinson). Perak, Gunong Batu Putih (Wray).

13. LEPADANTHUS, Ridl.

Herb; stem fistular. Leaves opposite, petioled, ovate toothed, thin. Flowers in axillary and terminal flexuous cymes. Sepals free nearly to base, ovate acute. Corolla as long as calyx, bilabiate, lower lip longer. Stamens 2. Ovary elliptic; style

long; stigma oblique, entire. Capsule as long as sepals, loculicidal. Seeds minute. Species 1.

(1) *L. flexuosa* Ridl. *Journ. As. Soc. Beng.* lxxiv. 782.

Herb 18 in. tall. Leaves 5 to 7 in. long, 4 in. wide; nerves 8 to 10 pairs, sparsely short hairy all over; petioles 3.5 in. long, slender hairy. Cymes 2 in. or more long. Peduncles slender, .5 in. long. Sepals .15 in. long. Corolla light blue. Capsule oblong, .25 in. long, blunt, glabrous. *Hab.* Limestone caves. Kedah, Gunong Geriang (Fox, Ridley). *Distrib.* South Siam.

14. RHYNCHOGLOSSUM, Blume.

Succulent nearly glabrous herbs. Leaves opposite, thin. Raceme terminal, lax; flowers pendent. Calyx campanulate, toothed. Corolla-tube cylindric, limb bilobed, upper very short, bifid, lower long, trilobed. Stamens 2, affixed to corolla-tube. Ovary ovoid. Capsule included in calyx, ellipsoid, 2-valved. Species 2, Indo-Malayan.

(1) *R. obliquum* Bl. *Bijdr.* 741; *Ridl., l.c.* 783.

Herb; 12 to 20 in. tall. Leaves 1 to 3 in. long, .5 to 1 in. wide, ovate acuminate; petioles .5 in. long. Raceme lax, 6 in. long; flowers numerous. Calyx .25 in. long, lobes lanceolate or triangular, .25 in. long. Corolla .6 in. long, lower lip several times longer than upper, light or dark violet. Capsule .3 in. long. *Hab.* Mountain forests; not common. Perak, Thaiping Hills (Fox); Batang Padang (Wray). *Distrib.* Tenasserim and Malay islands.

15. EPITHEMA, Blume.

Small succulent herbs, pubescent. Leaves few, alternate or opposite above, ovate usually cordate. Peduncles erect from upper axils. Bracts ovate or hooded. Flowers very small, blue and white in a scorpioid cyme. Calyx campanulate, 5-lobed. Corolla-limb 2-lipped; lobes sub-equal. Stamens 2; staminodes shorter. Ovary ovoid. Capsule globose enclosed in enlarged calyx on a thickened and longer pedicel splitting transversely. Species 2 or 3, Asiatic (possibly only one) and one or more African.

(1) *E. saxatile* Bl. *Bijdr.* 738; *Ridl. Journ. As. Soc. Beng.*, 44, p. 80; *Journ. As. Soc. Beng., l.c.* 784.

Soft herb 3 to 12 in. tall, viscid pubescent. Leaves very variable, ovate-cordate, denticulate or crenulate hairy, 1.5 to 6 in. long, 1 to 5 in. across; petioles .25 to 1.5 in. long. Peduncles 1 to 2 in. long. Cyme .75 in. long, many-flowered; flowers sessile subtended by a broad truncate toothed bract. Calyx tubular with 5 narrow lobes split down half-way. Corolla .25 in. long, tube white, upper lobes tipped violet, lower mauve with darker spots, mouth hairy. Capsule globose, pubescent. *Hab.* Limestone rocks. Pahang, Kota Glanggi. Selangor, Batu Caves. Perak, Telor Pinang, Ipoh;

Goping; Sungei Rayah and Batu Kurau (Kunstler). Lankawi islands (Curtis). Penang (Wallich). *Distrib.* Sumatra, Java, Borneo and probably the Indian *E. carnosum* is the same.

16. MONOPHYLLÆA, R. Br.

Succulent herbs with an unbranched stem bearing 2 leaves (the cotyledons), one very large cordate-ovate, the other very small, sessile, with conspicuous nerves. Racemes or cymes 1 or many from the leaf-base with numerous small white usually secund flowers pedicelled. Bracts 0. Calyx deeply 5-cleft, lobes elliptic, blunt. Corolla bilabiate. Stamens 4; filaments short; anthers cohering in pairs. Style short; stigma capitate. Capsule membranous, in the enlarged calyx, splitting irregularly. Species 7 or 8, Siam and Malay Archipelago.

- Leaf glabrous; sepals not spreading in fruit . . . (1) *M. Horsfieldii*
 Leaf strigose hairy; sepals spreading in fruit . . . (2) *M. patens*

(1) *M. Horsfieldii* R. Br. *Benn. Pl. Jav. Rar.* 121; *Ridl. Journ. As. Soc. Beng., l.c.* 785.

Stems 6 to 12 in. long. Leaf dark green, pale whitish beneath, quite glabrous, ovate-cordate, 6 to 12 in. long, 3 to 12 in. wide. Racemes 2 to 7 together, 9 in. long. Pedicels .25 in. long. Sepals ovate round. Corolla .25 in. across. Capsule globose enclosed in sepals. *Hab.* In rocky places usually on limestone. Selangor, Batu Caves. Perak, Goping (Kunstler); Batang Padang Valley; Kurau (Wray); Gunong Kerbau (Haniff). Jalor, Biserat (Gwynne-Vaughan). *Distrib.* Java, Sumatra.

(2) *M. patens* Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 82; *Journ. As. Soc. Beng., l.c.* 785.

Stem 1 to 4 in. long, hairy, viscid. Leaf ovate-cordate strigose hairy, 6 in. long, 4 to 6 in. wide. Racemes pubescent, 4 to 20, slender, 4 to 5 in. long; peduncles slender, .25 in. long. Sepals lanceolate, hairy, spreading in fruit. Corolla small. Capsule globose. Sepals spreading. *Hab.* Limestone rocks. Selangor, Batu Caves. Perak, Sungei Siput (Curtis); Batu Kurau (Scortechini); Goping (Kunstler).

17. STAURANTHERA, Benth.

Succulent herbs. Leaves alternate, the opposite ones reduced, elliptic or ovate, falcate, acuminate, inæquilateral. Cymes short peduncled, lax. Flowers showy. Calyx campanulate, lobes short. Corolla campanulate, tube shortly spurred or gibbous; limb 2-lipped, lobes round sub-equal. Stamens 4; anthers connate. Ovary ovoid; style short. Capsule depressed globose irregularly splitting. Species 3 or 4, Assam, Burma, Malay islands.

- Flowers large, violet, base of corolla spurred . . . (1) *S. grandiflora*
 Flowers small, white with violet spot, not spurred . . . (2) *S. umbrosa*

(1) **S. grandiflora** Benth. *Scroph. Ind.* 57; *Bot. Mag. t.* 5409; *Clarke, Conn. and Cyrt. Beng. t.* 89, bis; *Ridl. Journ. Roy. As. Soc. S. Br.* 44, p. 83; *Journ. As. Soc. Beng., l.c.* 586.

Stem about 6 in. tall. Leaves oblong very oblique, crenulate, shining, dark green, bullate pubescent, 6 in. long, 4 in. wide; petioles 1 in. long. Cymes pubescent, 3 in. long with about 9 flowers. Calyx-lobes lanceolate-ovate. Corolla violet with central yellow bar, spurred, 1.25 in. across. Capsule .2 in. wide. *Hab.* Rocky places, rather scarce. Perak, Larut (Kunstler); Batang Padang Valley. Penang (Wallich); Balik Pulau (Curtis). *Distrib.* Burma.

(2) **S. umbrosa** Clarke, *Comm. and Cyrt. Beng. t.* 89; *Ridl. Journ. Roy. As. Soc. S. Br.* 44, p. 83; *Journ. As. Soc. Beng., l.c.* 787. *Cyananthus umbrosa* Griff. *Notulæ*, iv, 154; *Ic. Pl. As. t.* 437.

Stem 3 to 6 in. tall. Leaves ovate-oblong, strigosely hairy, especially beneath, 6 to 8 in. long, 2 to 4 in. wide. Cymes few- to 10-flowered, hairy. Calyx cup-shaped, lobes triangular, .25 in. long. Corolla .5 in. across, white with a violet spot in centre. *Hab.* In rocky woods. Johor, Gunong Pantai. Pahang, Tahan River woods. Selangor, woods at the Batu Caves. Perak, Telok Pinang, Ipoh (Ridley). *Distrib.* Assam.

18. LOXONIA, Jack.

Slender hairy herbs. Leaves very unequal, one large obliquely elliptic acuminate, base inæquilateral, the other very small, rounded stipule-like. Cyme peduncled from axil of small leaf, branched. Flowers numerous small, white. Calyx deeply 5-fid, lobes lanceolate caudate-acuminate. Corolla small, tube short, limb 2-lipped, lobes unequal. Stamens 4, perfect exsert; anthers connivent. Ovary ovoid; style linear; stigma sub-bilobed. Capsule small ovoid shorter than calyx loculicidally bivalved; valves bifid. Seeds minute numerous cuboid reticulate. Species 1. Malayan.

(1) **L. acuminata** Br. in *Benn. Pl. Jav.* 105, t. 25; *Wight Ill. t.* 159, bis, fig. 6; *Clarke, DC. Monogr. Cyrtandrea*, p. 158.

Branched or simple herb 2 ft. tall, pilose all over (rarely glabrate), young leaves red-villous. Large leaf, oblong-elliptic, long-acuminate, base broad unequal; nerves 10 pairs; 4.5 to 7 in. wide; petioles .1 in. long; small leaf, .1 in. long, round. Peduncle 1 in. long; cyme .5 in. long and wide. Calyx .1 in. long. Capsule glabrous ovoid. *Hab.* Woods at 1000 ft. altitude, Johor, Pulau Tiuman (Burkill). *Distrib.* Java, Sumatra.

19. RHYNCHOTECUM, Blume.

Little-branched red-woolly shrubs. Leaves opposite or alternate. Cymes axillary on the lower part of the stem below the

leaves. Flowers numerous, small, white. Sepals free nearly to base. Corolla campanulate, 2-lipped; lobes sub-equal. Stamens 4, from near corolla base. Ovary round; style much longer. Berry small, globose, pulpy. Species about 9. India and Malaya.

(1) **R. parviflorum** *Bl. Bijdr.* 775; *Ridl. Journ. As. Soc. Beng., l.c.* 787. *Isanthera parviflora* *Ridl. Trans. Linn. Soc.* iii. 331.

About 3 ft. tall, red-hairy above. Leaves opposite, lanceolate acute, base cuneate, serrate, dark green, glabrous above, red-woolly beneath, 8 in. long, 3.5 in. wide; petioles 1 in. long. Cymes on bare part of stem about 2 in. long, lax branched. Corolla little longer than calyx-lobes, .15 in. long, yellowish white. Fruit ovoid-globose, hairy. *Hab.* Hill woods. Pahang, Kwala Tahan. Perak, Thaiping Hills (all collectors). Kelantan, Kwala Aring (Yapp). Penang (Wallich); Pulau Betong and Penara Bukit (Curtis). *Distrib.* Java, Sumatra.

20. CYRTANDROMÆA, Zoll.

Shrubs usually with square stems. Leaves opposite, herbaceous, ovate, elliptic or lanceolate, serrate. Flowers 1 to many in a cyme, axillary or basal. Calyx tubular, shortly 5-toothed, enlarged in fruit, usually red. Corolla large, white, tubular; tube dilate at top, lobes round, sub-equal. Stamens 4 in 2 pairs; anthers small ovoid. Pistil longer. Capsule globose or oblong enclosed in calyx, splitting irregularly, membranous. Species 12, Malaya, and Andaman, and Burma.

Flowers solitary in upper axils (1) **C. acuminata**

Flowers in short cymes on the bare part of stem below the leaves.

Big plants stout shrubby.

Leaves ovate, base rounded, cordate (2) **C. megaphylla**

Leaves ovate lanceolate, base long narrowed (3) **C. grandis**

Slender creeping plant; cymes small (4) **C. repens**

(1) **C. acuminata** *Benth. and Hook. Gen. Plan.* ii. 1020; *Ridl. Journ. As. Soc. Beng., l.c.* 788.

Shrubby, little branched, 3 to 4 ft. tall, pubescent above; stem below weak, pithy, pale coloured. Leaves thin lanceolate or ovate acuminate, narrowed and decurrent on petiole, serrate, nerves pubescent; 4 to 6 in. long, 2 to 3 in. wide; petioles 1 in. long. Flowers solitary in the axils of the upper leaves; peduncles hairy, .12 in. long. Calyx tubular, glabrous, .5 in. long, teeth acute small, red. Corolla nearly straight, 1 in. long, white. Capsule oblong, 4-sided, .25 in. long. *Hab.* In forests, usually in hilly regions. Negri Sembilan, Bukit Sulu (Cantley); Bukit Tangga. Selangor, Ginting Bidai; Menuang Gasing (Kloss). Perak,

Thaiping Hills (all collectors); Ulu Selama (Yapp); Temengoh. Tomoh (Machado). Tringganu, Bundi (Rostados). Penang (Porter); Penara Bukit (Curtis). Kelantan, Chaning. *Distrib.* Sumatra.

(2) **C. megaphylla** Hemsl. *Ic. Pl.* 1555; *Ridl., l.c.* 788.

A large spreading bush over 8 ft. tall. Leaves ovate acute, base round, often cordate serrate, pubescent, 6 to 10 in. long, 3 in. wide; petioles 3 to 5 in. long. Cymes several flowered a little above the axils, hairy, about 1 in. long. Calyx pubescent, .5 in. long, red, teeth short. Corolla 2 in. long, funnel-shaped, white, yellow in mouth. Capsule oblong, globose, .5 in. long. *Hab.* Forests. Selangor, Ginting Peras; Weld's Hill. Perak, Thaiping Hills (Wray); Gunong Batu Putih (Kunstler); Gunong Berumbun near Telom.

(3) **C. grandis** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 87; *Journ. As. Soc. Beng., l.c.* 789.

A large shrub about 5 to 7 ft. tall with a stout woody base, over .5 in. through, above herbaceous glabrous. Leaves ovate-lanceolate acuminate, base long-narrowed, denticulate, glabrous, 12 in. long, 4 in. wide; petioles 1.25 in. long. Cymes large, many-flowered, hardly peduncled, often 3 in. through, on the base of the stem, pubescent. Calyx pubescent, red, .5 in. long with short linear lobes. Corolla white, 1.25 in. long. Capsule globose, .5 in. long. *Hab.* Banks in forests. Selangor, Kwala Lumpur; Semangkok Pass; Bukit Hitam; Sungei Buluh; - Ulu Gombak. Negri Sembilan, Johol. Perak, Ulu Bubong and Gunong Batu Putih (Kunstler). Kelantan, Kwala Aring (Yapp).

(4) **C. repens** Ridl. *Journ. Roy. As. Soc. S. Br.* 57, p. 74.

Slender woody creeping plant ascending 1 ft. or more, tomentose pubescent. Leaves obovate, thin, serrate narrowed to base, pubescent-hairy, 2.5 to 3 in. long, 2 in. wide; petioles slender, 1.5 in. long. Cymes below the leaves, .75 in. long, compact, many-flowered; peduncles .25 in. long, all pubescent. Calyx tubular, .25 in. long with setaceous lobes, red. Corolla base narrow, dilate upwards, white, 1 in. long. *Hab.* Sandy river banks in forests, very local. Perak, banks near river, Temengoh (Ridley).

21. CYRTANDRA, Forst.

Shrubby usually terrestrial plants. Leaves opposite or alternate by suppression of one. Cymes axillary, many-flowered. Bracts small or large and connate in a cup. Calyx tubular, 5-lobed. Corolla funnel-shaped, straight, white, usually 2-lipped. Stamens 2, adnate to corolla; anthers not connivent. Ovary ovoid or oblong. Style long; stigma bilobed. Fruit a brown fleshy cylindric beaked berry. Seeds minute. Species 200, abundant in Polynesia and westward to Sumatra, disappearing in Burma.

Bracts free.

- Leaves unequal, one of a pair small or suppressed.
 Erect terrestrial shrub; leaves dentate . . . (1) *C. dispar*
 Creeping; leaves alternate ovate, entire or crenate; flowers in heads; peduncle long.
 Leaves not cordate . . . (2) *C. pendula*
 Leaves cordate hairy beneath . . . (3) *C. rotundifolia*
 Epiphyte on rocks; plants glabrous; leaves lanceolate falcate.
 Leaves alternate or opposite leaf small . . . (4) *C. falcata*
 Leaves unequal but opposite . . . (5) *C. suffruticosa*
 Terrestrial; leaves in equal pairs.
 Shrubs 6 ft. tall branched; leaves serrate; calyx with 5 points; flowers small . . . (6) *C. patula*
 Shrub 2 to 3 ft. tall; leaves serrate; calyx bifid . . . (7) *C. pilosa*
 Shrub 1 ft. tall; leaves crenate; calyx trifid . . . (8) *C. lanceolata*
 Shrublet under 12 in. tall; leaves obovate, bullate; calyx bilobed . . . (9) *C. Gimlettii*

Bracts connate in a large white cup.

- Leaves glabrous . . . (10) *C. grandiflora*
 Leaves hairy at least beneath.
 Leaves 12 in. long, more or less sparsely hairy above . . . (11) *C. cupulata*
 Leaves 5 in. long, glabrous above, pustular hairy beneath . . . (12) *C. barbata*

(1) *C. dispar* DC. *Prodr.* ix. 282; *Ridl. Journ. As. Soc. Beng.*, l.c. 790; *Clarke, Mon. Phan.* v. i. 203, t. 23.

Shrublet about 3 ft. tall, bark pale in oblong flakes. Leaves alternate obovate-ob lanceolate inæquilateral strongly toothed, glabrous above, red pubescent beneath, 12 in. long, 4 in. wide; petioles 1 in. long. Cymes axillary sessile; flowers numerous. Calyx cup-shaped, lobes lanceolate acuminate, hairy. Corolla white, .5 in. long, hairy outside. Berry .25 in. long, hairy. *Hab.* Mountain woods, Perak, Bujong Malacca and Thaiping Hills. Penang (Wallich, Maingay, Curtis and all collectors).

(2) *C. pendula* Bl. *Bijdr.* 768; *Ridl.*, l.c. 792. *C. bicolor* Jack, *Trans. Linn. Soc.* xiv. 27.

Stems creeping, ascending subherbaceous. Leaves alternate ovate, blunt or cuneate at base, entire or crenate, dark green, barred with white or not above, with reddish tomentum beneath, 5 to 8 in. long, 3 to 6 in. wide; petioles 3 to 6 in. long. Flowers in a head of about 20 on a decurved peduncle 4 in. long, appressed hairy; bracts lanceolate hairy. Calyx .5 in. long, shortly bifid. Corolla 1.5 in. long, base narrow, above ventricose hairy, creamy white or pale yellow with purple spots in mouth and tube. Berry .5 in. long. *Hab.* Common in lowland forests, Singapore, Bukit Timah. Johor, Gunong Pantai; Pulau Tioman. Pahang, Kwala Tembeling. Malacca (Maingay). Negri Sembilan, Bukit Tangga. Selangor, Ulu Gombak; Kwala Lumpur; Bukit Hitam. Sungei Ujong, Bukit Sulu (Cantley). Perak, Thaiping Hills (Curtis); Ulu Bera (Kunstler). *Distrib.* Java, Sumatra.

(3) **C. rotundifolia** Ridl. *Journ. Roy. As. Soc. S. Br.* 57, p. 76.

Stem about 3 in. tall, brown-hairy. Leaves ovate-round cordate sub-coriaceous, glabrous above, densely hairy beneath, 6 in. long and wide; petioles 3 to 6 in. long. Flowers numerous in deflexed heads over 1 in. through on brown hairy peduncles 3 in. long. Bracts lanceolate hairy, .5 in. long. Calyx .75 in. long with short subulate points. Corolla 1 in. long, silky outside, white with brown marks in mouth. Berry corky, cylindric acuminate, .75 in. long. *Hab.* Wet woods, local. Perak, Temengoh along the Sungei Tampan (Ridley).

(4) **C. falcata** Ridl. *Journ. Roy. As. Soc. S. Br.* 44, p. 89; *Journ. As. Soc. Beng., l.c.* 791.

Epiphyte about 2 ft. tall; stem 4-angled, hollow. Leaves lanceolate acuminate falcate alternate or with small opposite ones, glabrous narrowed at base, 7 to 8 in. long, 1.5 in. wide; petioles 1 in. long, pubescent. Cymes axillary short-peduncled. Bracts ovate acute, pubescent, .5 in. long. Flowers few. Berry fusiform, .5 in. long. *Hab.* Selangor, woods near Batu Caves. Perak, Tupai; Larut (Wray and Scortechini).

(5) **C. suffruticosa** Ridl. *Trans. Linn. Soc.* iii. 330; *Journ. As. Soc. Beng., l.c.* 791.

Large shrub 4 ft. tall; stems hollow, 4-angled pale. Leaves opposite often very unequal, lanceolate falcate inæquilateral entire, glabrous when adult, 7 to 9 in. long, 2.5 to 3 in. wide; petioles .5 to .75 in. long. Peduncles short and thick, axillary. Bracts ovate pubescent, 1 in. long. Sepals linear. Corolla glabrous, over 1 in. long, tube cylindric, white with brown streaks in throat. Berry .75 in. long, sausage-shaped. *Hab.* On rocks or epiphytic on trees, Johor, Tenggara (Feilding); Pulau Tiuman. Perak, Goping and Kota Bharu (Kunstler); Tupai (Wray).

(6) **C. patula** Ridl. *Journ. Roy. As. Soc. S. Br.* 86, p. 303.

Large spreading bush about 6 ft. tall, bark corky wrinkled pale below, young parts tomentose. Leaves opposite, equal, chartaceous oblanceolate acute, base long-narrowed, edge serrate; glabrous above, midrib and nerves 15 pairs hairy beneath (young leaves tomentose), 11 to 12 in. long, 4 in. wide; petioles .25 to .1 in. long, tomentose when young. Cyme .4 in. long, with 7 or 8 flowers, silky hairy. Bracts small hairy. Pedicels .1 to .2 in. long. Calyx tubular with 5 very slender points silky hairy, .1 in. long. Corolla .5 in. long, campanulate, lobes rounded, silky hairy outside, dull white with brown mottling in the throat. Stamens white; anthers connivent. Fruit slender, cylindric narrowed to the style, glabrous. *Hab.* Muddy wet spots in a stream, Negri Sembilan, Bukit Tangga (Ridley).

(7) **C. pilosa** Bl. *Bijdr.* 770; Ridl. *Journ. As. Soc. Beng., l.c.* 791. *C. decurrens* De Vries, *Pl. Ind. Bat. Reinwdt*, 14; Clarke, *Mon. Phan.* v (1), 231.

Shrub about 2 to 3 ft. tall; stems hollowed, thick above, pubescent. Leaves opposite obovate or oblanceolate, narrowed into a winged petiole, serrate abruptly acute, above pubescent or glabrous when adult, beneath red-hairy, 8 to 18 in. long, 3 to 4 in. wide. Cymes small axillary, hairy sub-sessile. Bracts free, ovate or lanceolate, 1 in. long. Calyx tubular bifid, hairy, .5 in. long. Corolla white, silky-hairy, tube funnel-shaped. Berry ovoid, conic tessellate, .5 to .75 in. long. *Hab.* Banks in forests up to 4000 ft. altitude, Johor, Gunong Pantai; Bukit Tanah Abang (Kelsall). Negri Sembilan; Bukit Tangga, Seremban (Napier); Bukit Sulu (Cantley). Selangor, Bukit Kutu; Bukit Hitam (Kelsall); Bukit Menuang Gasing (Kloss). Perak, Thaiping Hills (all collectors); Gunong Kerbau 4000 ft. altitude (Robinson). Penang (Wallich); Penara Bukit (Curtis). *Distrib.* Tenasserim to New Guinea. *Native name*: Poko Gugunjah Bukit.

(8) *C. lanceolata* Ridl. *Journ. Linn. Soc.* xxxii. 527; *Journ. As. Soc. Beng., l.c.* 792.

Stem about 1 ft. tall, 4-angled, pubescent above, base nude. Leaves oblanceolate acute, base narrowed crenulate nearly glabrous, 12 in. long, 4 in. wide. Cymes on bare part of stem at base lax many-flowered, hispid. Bracts lanceolate small. Calyx 1.5 in. long, hairy, lobes 3, linear acuminate. Corolla 1.5 in. long, pubescent, white, throat yellow. *Hab.* Johor, Gunong Pantai (Ridley). Rare.

(9) *C. Gimlettii* Ridl. *Journ. Roy. As. Soc. S. Br.* 49, p. 21.

Dwarf erect plant, 4 to 6 in. tall, pubescent. Leaves obovate sub-acute narrowed to base, bullate serrate sparsely hairy above, densely so beneath, 6 in. long, 4 in. wide. Flowers sessile in tufts of 4 to 5 together from axils of leaves. Bracts small ovate, whitish yellow, hairy. Calyx short tubular bilobed with 2 acute points, hairy. Corolla-tube .5 in. thick, curved dilate upwards, limb .5 in. across, lobes blunt, upper triangular, lower oblong, creamy white, lower lip yellow with a deep purple blotch ending in 2 purple bars. Stamens purple. *Hab.* Kelantan, Kwala Lebir (Gimlette); very abundant in forests round Chaning estate.

(10) *C. grandiflora* Ridl. *Journ. F.M.S. Mus.* iv. 52.

Large plant 3 ft. tall; stem glabrous. Leaves oblanceolate acuminate, glabrous when adult, decurrent on petiole, serrate, deep green, beneath purple, 8 to 12 in. long, 3 to 4 in. wide. Bracts cup-shaped connate, ciliate, 1 in. long with ovate points. Calyx .3 in. long, tubular, 3-lobed. Corolla-tube short, stout silky, limb 2 in. across, upper lobe bilobed, lower 3-lobed, lobes oblong, all silky white, mouth of tube yellow. Berry cylindric-conic with an abrupt point, 1 in. long. *Hab.* Abundant by streams but local, in mountain forests at 3000 ft. altitude. Pahang, Telom (Ridley).

(11) *C. cupulata* Ridl. *Journ. Linn. Soc.* xxxii. 527; *Journ. As. Soc. Beng., l.c.* 793.

Shrubby plant, with a stout stem, 2 to 3 ft. tall, red-hairy.

Leaves opposite oblanceolate or obovate narrowed to base, serrate sparse hairy above, more so beneath, 12 in. long, 4 in. wide; petioles 1 in. or more long, villous. Peduncles .5 in. long, axillary in pairs, bearing a large white cup of 2 connate bracts, hairy, 1 in. long. Flowers numerous, little longer. Corolla 1 in. long, funnel-shaped, white, with yellow and brown marks in mouth. Fruit fusiform, .5 in. long. *Hab.* Dense forest, Pahang, Tahan River woods up to 1000 ft. altitude. Malacca, base of Mt. Ophir; Sungei Buluh; Selangor, Ginting Bidai; Ulu Gombak; Klang Gates; Kanching. Kedah, Gunong Bintang (a very hairy form). Kelantan, Chaning (Ridley).

var. *minor* Ridl. A smaller and more slender plant. Leaves quite glabrous above, thickly hairy on nerves beneath, 9 in. long by 3 in. wide or less; petioles rather slender. Inflorescence sessile much smaller than in type. Bract-cup .5 in. long, glabrous except nerves. Corolla .75 in. long, white with no brown marks in the throat. *Hab.* In forests. Kelantan, by the river at Chaning and Kwala Lebir (Ridley).

(12) *C. barbata* Ridl. *Journ. Roy. As. Soc. S. Br.* 57, p. 75.

Stem thickly hairy. Leaves oblanceolate acuminate, base narrowed to petiole, serrate pustular, glabrous above, pustular hairy with dense hair on nerves beneath, 5 in. long, 3 in. wide. Bracts connate in a cup bilobed, lobes lanceolate acuminate, broadly tubular at base, hairy, .75 in. long. Flowers 2 or 3. Calyx as long as corolla-tube, lobes lanceolate, sparsely hairy. Corolla 1 in. long, glabrous, white, lower lip oblong, lobes rounded. *Hab.* In damp woods. Perak, Temengoh (Ridley).

Rare and very local. I only saw one plant in flower.

ORDER CIV. BIGNONIACEÆ

Trees or climbers (rarely herbs). Leaves opposite, rarely alternate pinnate (or digitate) or simple. Racemes or panicles terminal or axillary. Flowers showy, usually large irregular or sub-regular. Calyx gamosepalous campanulate or spathaceous or 2- to 5-lobed. Corolla gamopetalous, tubular or ventricose, lobes 5, sub-equal. Stamens 4 (more rarely 5) filaments filiform; anthers 2-celled, cells divergent or parallel. Ovary 1- or 2-celled; style long filiform; stigma of 2 flattened ovate lobes. Capsule elongate, flat bivalved. Seeds flat with a broad wing. Species about 50, tropics, mostly South American. (Prain, *Journ. As. Soc. Beng.* lxxiv. (2), 375). Several ornamental species are cultivated in our gardens, notably *Spathodea nilotica*, a big tree with scarlet flowers; and some South American *Bignonias*, climbers, and *Tecomas*.

Millingtonia hortensis Linn. *fil.* Given as a doubtful native by Prain, a tree with corky bark, tripinnate leaves and long tubular white flowers, is certainly not a native. I never saw a plant in

the Peninsula till I introduced it into Singapore about 1908, but there is a specimen from Malacca in Maingay's herbarium; it appears to be Burmese in origin.

Trees.

- | | |
|---|------------------|
| Stamens 5; leaves tripinnate very large; capsules 3 to 4 ft. long | 1. OROXYLUM |
| Stamens 4; leaves 1- to 3-pinnate. | |
| Calyx spathaceous split on one side; corolla white, tube long | 2. DOLICHANDRONE |
| Calyx lobed or truncate. | |
| Capsule winged; flowers large in a large erect panicle | 3. PAJANELIA |
| Capsule not winged. | |
| Seeds trigonous; wings corky; flowers medium | 4. STEREOSPERMUM |
| Seeds flat; wings hyaline; flowers medium | 5. RADERMACHERA |
| Calyx sub-globose irregularly 3- to 5-lobed; flowers large, light yellow | 6. HETEROPHRAGMA |
| Leaves simple, large, panicle head-like; flowers yellow | 7. DIPLANTHERA |
| Climber; leaflets 5; flowers in axillary and terminal umbels, white and pinkish | 8. PANDOREA |

1. OROXYLUM, Vent.

Slender tree hardly branched. Leaves at the top of the bare stem, 3-pinnate very large; leaflets numerous, entire. Flowers large in an erect terminal raceme. Calyx large, leathery, campanulate, truncate. Corolla leathery, tube widely ventricose, lobes 5. Stamens 5, insert near base of tube; anthers 2-celled. Ovary contracted at base. Capsule flat sword-shaped, very large, bivalved. Seeds numerous, flat with large thin wing. Species 1, tropical Asia.

(1) *O. indicum* Vent. *Dec. Gen. Nov.* 8; *Prain, Journ. As. Soc. Beng., l.c.* 376.

Tree 30 to 40 ft. tall, not branched unless cut back. Leaves 5 ft. long and as wide; leaflets very many, ovate acuminate, rather thin, base unequal except the terminal one cuneate. Raceme 3 to 6 ft. long, erect, flowers opening one at a time. Calyx 1 in. long with 5 short lobes. Corolla 3 in. long, 1.5 in. wide, dull brown pink outside, creamy within. Capsule pendent about 4 ft. long, 3.5 in. wide. Seeds thin, papery, 3 in. long, 1.5 in. wide, flat sub-rectangular, very numerous. *Hab.* By rivers and in lowland swampy country very abundant and conspicuous. Malacca, Selangor. Pahang along river. Selangor, Kampong Kerling (Goodenough); common all over the mining districts. Perak, Teluk Anson. Penang, Pulau Betong (Curtis). Perlis, Kanga. *Distrib.* Indo-Malaya, Siam. *Native name*: Bulai.

2. DOLICHANDRONE, Fenzl.

Tree. Leaves opposite, pinnate. Flowers in terminal racemes or panicles, few, large. Calyx spathaceous cleft down the front.

Corolla-tube long (or short) dilate above; lobes 5, equal, edge crisped. Stamens 4, didynamous, included; anthers oblong. Ovary sessile. Capsule elongate, terete, 2-valved. Seeds numerous, flat winged. Species about 15, Africa to Australia.

(1) **D. Rheedii** Seem. *Journ. Bot.* viii. 380; *Prain, l.c.* 377. *D. spathacea* Schum. *Fl. Kaiser Wilhelms land*, 123; *Sprague, Kew Bulletin*, 1919, p. 304.

Tree 40 to 50 ft. tall or less. Leaves imparipinnate, 9 to 12 in. long; leaflets 4 pairs and 1 end-one, rhomboid, base unequal, acuminate serrate, 3 to 4 in. long, 1.5 to 2.5 in. wide. Raceme 1 to 4 or more flowered; flowers nocturnal opening singly and falling at dawn. Calyx 1.5 in. long. Corolla tubular, funnel-shaped above, pure white, 5 in. long; lobes 1.5 in. long, rounded, crisped. Capsule 10 to 12 in. long, 1 in. broad. Seeds quadrate, oblong, .5 in. long, .25 in. wide, corky thin. *Hab.* Tidal swamps. Common. Singapore, Alexandra Road; Bajau. Malacca, Ayer Panas (Cantley); near coast (Griffith, Maingay); Pahang, Kwala Bruas, Pahang River. Perak, Matang (Scortechini). Penang, Pulau Betong (Curtis). Setul. Perlis, Kanga. *Distrib.* India to New Guinea. *Native name*: Poko Kulo.

3. PAJANELIA, DC.

A tall glabrous tree. Leaves large imparipinnate; leaflets entire, 10 to 12 pairs. Flowers large in terminal panicles, yellow. Calyx large ventricose campanulate, 5-lobed. Corolla-tube cylindric below, dilate above; lobes 5, sub-bilabiate. Stamens 4 with a rudimentary one, exsert. Capsule elongate, narrow-oblong, the valves winged. Seeds flat, wing hyaline. One species, India and Malay Peninsula.

(1) **P. multijuga** DC. *Prodr.* ix. 227; *Prain, l.c.* 382; *Wall. Pl. As. Rav.* i, 81, *t.* 95 and 96.

Little branched tree 60 to 80 ft. tall, 2 ft. through. Leaves 2 ft. long; leaflets elliptic-ovate acute, base round inæquilateral, 4 to 8 in. long, 2.5 to 3.5 in. wide; petioles .2 in. long. Panicles stout erect, .2 in. long. Calyx 1 to 1.5 in. long, lobes acute. Corolla 2 to 2.5 in. long, yellowish white outside, purple inside, upper part pubescent. Capsule 1 to 1.5 ft. long, 2 to 2.5 in. wide. Seeds 1.5 in. long and .5 in. wide with wing. *Hab.* Sea-coasts; not at all common. Singapore, Kranji (Ridley); Perak (Scortechini, Kunstler); base of the Thaiping Hills. Penang (Jack).

4. STEREOSPERMUM, Cham.

Trees. Leaves 1- to 2-pinnate. Flowers in terminal panicles white, pink or yellow. Calyx truncate or shortly unequally lobed. Corolla campanulate or funnel-shaped, 2-lipped, lobes toothed or laciniate. Stamens 4, cells linear divergent. Capsule elongate

cylindric, septum thick corky, cylindric pitted. Seed trigonous, wings membranous. Species 12, Africa, tropical Asia.

Corolla funnel-shaped pale lilac; edges fringed . . . (1) *S. fimbriatum*
 Corolla cylindric campanulate, yellow crisped . . . (2) *S. chelonoides*

(1) *S. fimbriatum* DC. *Prodr.* ix. 211; *Prain*, l.c. 378.

Tree about 80 ft. tall, stem 1 to 3 ft. through. Leaves imparipinnate, 1 to 2 ft. long; rachis viscid pilose; leaflets 7 to 9, oblong-lanceolate, long-acuminate, laterals oblique at base cuneate, 4 to 6 in. long, 1.5 to 1.75 in. wide; nerves 7 pairs, prominent. Panicles up to 12 in. long and wide, viscid pilose. Calyx tubular-campanulate pubescent outside, .5 in. long with short pointed lobes. Corolla pale lilac, tube funnel-shaped, 1.5 in. long, limb 2.5 in. across, long-fimbriate. Capsule cylindric slightly torulose, 1 to 2 ft. long, .5 in. through. Seed trigonous with thick wings 1 in. long, .3 in. wide. *Hab.* Common in forests in lower ranges. Pahang, Pekan (Haviland); Kuantan (Foxworthy). Malacca, Batu Ampat (Goodenough); Jus (Cantley); Ayer Panas. Perak, Kampong Kota (Wray). Lankawi, Kwah (Curtis). Perlis, Kanga. *Distrib.* Burma, south to Malay Peninsula. *Native names:* Chachar; Lumpoyan.

(2) *S. chelonoides* DC. *Prodr.* ix. 20; *Clarke in Hook. fil. F.B.I.* iv. 382.

A tree about 30 to 60 ft. tall. Leaves simply pinnate, 12 to 18 in. long, leaflets elliptic caudate-acuminate, glabrous, 7 to 11, about 5 in. long, 2.5 in. wide; petiolules .13 in. long. Calyx .25 in. long, oblique campanulate. Corolla thinly villous all over, tube cylindric-campanulate, curved, .5 in. long, limb .5 in. across, light yellow, crisped. Fruit 1 to 2 ft. long, twisted linear, .5 in. through or less. Seeds 1 in. long. *Hab.* Woods not common, Singapore, Bukit Timah; Tanglin (Ridley). Penang, Glugor (Curtis). *Distrib.* India to Burma.

5. *RADERMACHERA*, Zoll. and Mor.

Trees. Leaves 1- to 2-pinnate. Flowers in racemes or panicles. Calyx urceolate, entire or shortly lobed. Corolla funnel-shaped, upper lip 2, lower 3-lobed. Stamens 4, cells divaricate. Ovary cylindric. Capsule slender, terete twisted, septum slender. Seeds small with hyaline wings. About 8 species, Burma, Malaya.

Leaves 1-pinnate; leaflets glandular at base; capsule
 10 in. long (1) *R. stricta*

Leaves 2- to 3-pinnate, not glandular; capsule over
 15 in. long (2) *R. amœna*

(1) *R. stricta* Zoll. and Mor. *Syst. Verz. Ind. Arch.* 53. *R. glandulosa* K. Sch. *Engl. and Prantl. Pflanzenfam.* iv. 3, B. 243; *Prain*, l.c. 380.

Small tree about 30 ft. tall or less; stem 6 to 12 in. through.

Leaves 15 to 20 in. long; leaflets 3 to 7, elliptic acuminate or blunt, base cuneate with 2 large glands, 5 to 13 in. long, 3 to 4 in. wide; petiolules .3 in. long or less, end-one 1 in. long. Panicles terminal and axillary, 8 to 12 in. long with short branches .5 in. long, few-flowered. Calyx campanulate truncate, dark purple. Corolla-tube cylindric, .25 in. long, curved, campanulate above, 1 in. long, lobes short, rounded, limb .5 in. across, pink outside, white inside. Capsule terete slender, 6 to 10 in. long, .25 in. through. Seeds thin flat small with oblong blunt hyaline wings, .3 in. long, .1 in. across. *Hab.* Forests often on stream banks. A very pretty tree, Malacca, Batang Malaka (Derry). Negri Sembilan, Tampin; Bukit Payong and Bukit Kandang (Cantley). Pahang, Kwala Tenok, Tahan River. Selangor, Ulu Gombak; Batu Caves. Perak, Temengoh; Tapah (Wray). Penang, Sungei Penang (Curtis, Wallich). *Distrib.* Burma, Sumatra, Java, Borneo. *Native name*: Lumpoyan.

(2) *R. amœna* Seem. *Journ. Bot.* viii. 146; *Prair*, l.c. 381.

Tree up to 80 ft. tall. Leaves 2- to 3-pinnate, over 2 ft. long; leaflets oblanceolate obtuse, narrowed to base or elliptic, 4 to 6 in. long, 2 to 3 in. wide; petiolules .2 in. long. Panicles axillary, terminal, 6 in. long. Calyx 2-lipped, lips apiculate, .3 in. long. Corolla-tube .2 in. long, cylindric then campanulate, lobes equal rounded crenulate, .5 in. across, white tinted pink with yellow in throat. Capsule slender, flat, 10 in. long, .2 in. wide, thin. Seed .75 in. long with wings, flat hyaline on a cylindric spongy septum. *Hab.* Woods. Singapore, Tanglin Road; Bukit Mandai; Bukit Timah. Malacca (Maingay, Griffith). Selangor, Kwala Lumpur. Perak, Thaiping and Batu Togo (Wray). Perlis, Chupeng. *Distrib.* Burma, Java. *Native name*: Bunga Pawang.

6. HETEROPHRAGMA, DC.

Trees. Leaves pinnate, large, coriaceous. Panicles terminal, woolly. Calyx ovoid, 3- to 5-lobed. Corolla tubular ventricose, yellow (or pink), lobes 5, round. Capsule elongate, cylindric (or compressed), twisted, 2-valved. Seeds flat winged. Species 5, Indo-African.

(1) *H. adenophyllum* Seem. *Benth. Gen. Pl.* ii. 1047; *Clarke in Hook. fil. F.B.I.* iv. 381.

Tree stout about 50 ft. tall; branchlets tomentose. Leaves 1.5 ft. long; leaflets 5 or 7, usually 5 to 7 in. long, 4 in. wide, glabrous above; nerves raised beneath tomentose. Panicle about 8 in. long, brown velvety, about 3 to 6 in. across. Calyx woolly brown, 1 in. long. Corolla 2 in. long, woolly tomentose, outside yellow, darkest inside. Capsule 1 to 2 ft. long, spiral twisted, 1 in. through. Seed 1.5 in. long, .5 in. across. *Hab.* Open country in the north, Kedah, Alor Sta. Perlis, Chupeng (Ridley). *Distrib.* Burma, Assam, Siam.

7. **DIPLANTHERA**, Banks and Solander

Trees, pubescent. Leaves simple, large, opposite. Flowers medium size, yellow in dense panicles in upper axils. Calyx campanulate, lobes 2 to 5. Corolla tubular-ventricose, lobes 6, round. Stamens 4, didynamous. Ovary sub-sessile. Capsule oblong-fusiform woody, loculicidally 2-valved. Seeds flat, wing hyaline broad. Species about 6, Malay Peninsula to Australia.

(1) **D. bancana** Scheff. *Nat. Tijdschr.* xxxi. 334; *Prain, l.c.* 383.

Tree about 80 ft. tall. Leaves sub-coriaceous, ovate, base broad cordate; nerves and reticulations prominent beneath, above



FIG. 125.—*Pandorea Curtisi*.

glabrous, beneath tomentose pubescent, 8 to 13 in. long, 5 to 8 in. wide; petioles stout, 2 in. long. Panicle rather compact, 3.5 to 5 in. across on a pubescent peduncle, 4 in. long, branches 1 in. long or more radiating with terminal umbel of yellow flowers all tomentose except corolla. Calyx .7 in. long. Corolla 1 in. long and wide, bright yellow. Capsule lanceolate-elliptic, 6 in. long, 2 in. across, narrowed at both ends. Seed 1.5 in. long, .75 in. wide, winged on both sides. *Hab.* Woods; not very common. Malacca, Bukit Sadanen; Batu Feringhi (Curtis); Sungei Hudang (Derry). Negri Sembilan, Port Dickson (Foxworthy). Selangor, Ginting Bidai. Penang, Batu Feringhi and Hill (Curtis), a glabrescent form. *Distrib.* Bangka, Borneo. *Native name:* Kayu Chenderu,

8. PANDOREA, Spach.

Slender climbers. Leaves opposite imparipinnate. Panicles or umbels axillary, peduncled. Calyx cup-shaped, small. Corolla funnel-shaped, hardly bilabiate, lobes round. Stamens 4 on the corolla-tube perfect, one staminode, anther-cells divaricate. Style long, filiform; stigma small. Capsule flat elliptic, narrowed at both ends. Seed flat winged, thin. Species 5 or 6, Malay isles and Australasia.

(1) *P. Curtisii* Ridl. *Tecoma Curtisii* Ridl. *Journ. Roy. As. Soc. S. Br.* 49, p. 26. (Fig. 125, p. 552).

Glabrous slender twiner. Leaves 4 to 5 in. long, including the petioles 1 to 2 in. long; leaflets 5, elliptic caudate, base rounded, 2 in. long, 1 in. wide; petiolules lateral ones 1 in. long, terminal one 25 in. long. Cymes axillary and terminal. Flowers numerous. Pedicels 12 in. long. Calyx 25 in. long, greenish purple, 5-toothed. Corolla 2 in. long, base cylindric funnel-shaped above, 1 in. across, outside pinkish yellow, inside orange yellow, lobes white. Fruit unknown. *Hab.* Rare and local. Penang, Batu Feringhi and by the Chitty Temple (Curtis).

ORDER CV. PEDALINEÆ

Herbs or undershrubs. Leaves opposite alternate, above entire or lobed. Flowers axillary solitary (or clustered); pedicels short. Sepals 4 to 5, connate. Corolla tubular ventricose; limb 5-lobed, obscurely 2-lipped. Stamens 4 (rarely 2). Carpels 2, connate. Ovary 2-(rarely 1-)celled. Ovules many (or few). Style filiform; stigma bilobed. Fruit (hard indehiscent) or a 2-(rarely 3- to 4-)valved capsule. Seeds small. Species 40, tropics.

1. SESAMUM, Linn.

Erect or prostrate herbs. Flowers axillary solitary or 2 or 3 together. Sepals 5. Corolla 2-lipped. Carpels in a 2-celled ovary. Capsule oblong 4-angled, 4-grooved, 4-celled. Seeds numerous, very small. Species 10, Africa, Asia.

(1) *S. indicum* DC. *Prodr.* ix. 250; *Prain, l.c.* 386.

Pubescent herb, 2 ft. tall. Leaves oblong-ovate, lobed or narrow, entire, 3 to 5 in. long, 1 in. or more or less wide (variable). Flowers usually solitary axillary numerous; pedicels 5 in. long. Calyx-lobes lanceolate. Corolla pubescent, white or more or less pink. Capsule pilose, 1 in. long, 25 in. through, bivalved. Seeds small elliptic, white or black. *Hab.* Waste ground. Cultivated by Tamils, much used for the oil obtained by crushing it. *Native names:* Bijan; Lenga; Tilseed.

ORDER CVI. ACANTHACEÆ

Herbs, shrubs or twiners, rarely lianes (*Thunbergia*). Leaves opposite, often unequal, in some *Polytrema*s alternate. Flowers often showy strobilate spikes, heads or cymes, bisexual, irregular. Calyx inferior at base; lobes 5 or 4, nearly free to base. Corolla gamopetalous, tube campanulate or cylindric, limb 2-lipped or 5-lobed. Stamens 4, didynamous or 2, anther-cells 2 or 1. Pollen ellipsoid and ribbed or globose, honeycombed or spiny. Ovary superior, 2-celled. Ovules 2 or 1 or several, superimposed in vertical rows (or 2 collateral, *Thunbergia*). Style long, bifid at top. Capsule loculicidal, often elastically dehiscent. Seeds usually as many as ovules, held up on retinacula, curved stiff outgrowths of the funicle by which they are ejected from the capsule. Species 2000, tropics and sub-tropics. (Clarke, *Journ. As. Soc. Beng.* lxxiv. 628.)

- | | |
|---|-------------------|
| Twining, with, 3 or 2 seeds in capsule. | 1. THUNBERGIA |
| Herbs; seeds 8 to 16 in 2 rows in capsule; no retinacula. | |
| Stamens 2 | 2. NELSONIA |
| Stamens 4 | 3. STAUROGYNE |
| Retinacula present. | |
| <i>Capsule with more than 4 seeds</i> hygroscopically shaggy on edge. | |
| Capsule clavate. Pollen honeycombed . | 4. RUELLIA |
| Capsule seed-bearing from base. Pollen spiny . | 5. APORUELLIA |
| Capsule hardly stalked. Pollen ellipsoid, ribbed. | |
| Corolla distinctly 2-lipped. | |
| Spikes in continuous or axillary clusters. | 6. HYGROPHILA |
| Flowers in 1-sided axillary racemes . | 7. NOMAPHILA |
| Corolla hardly 2-lipped. | |
| Panicle thyroid, hardly 1 ft. long . | 8. STENOXYRIS |
| Spikes terminal or axillary, dense with distinct bracts . | 9. HEMIGRAPHIS |
| <i>Capsule with 4 or 2 seeds.</i> Corolla indistinctly 2-lipped; shrubby herbs or bushes. | |
| Pollen ellipsoid, ribbed. | |
| Stamens 2 | 10. ENDOPOGON |
| Stamens 4 | 11. STROBILANTHES |
| Pollen globose, spiny; stamens 4 . | 12. ACANTHOPALE |
| Corolla with upper lip small, lower 3-lobed, midlobe bifid; spiny-leaved, tidal mud herbs . | 13. ACANTHUS |
| Corolla 2-lipped, lobes imbricate in bud; retinacula present. | |
| <i>Capsule with more than 4 seeds; stamens 2.</i> | |
| Capsule cylindric solid at base; seeds in globose top . | 14. PHLOGACANTHUS |
| Capsule with parallel sides seed bearing from base; corolla-tube cylindric. | |
| Seeds hairy on edge; flowers in long spikes | 15. GYMNSTACHYUM |
| Seeds glabrous, much-branched herbs; flowers distant | 16. ANDROGRAPHIS |

- Capsule 4-seeded; stamens 4.*
 Sepals connate half-way 17. PHIALACANTHUS
 Sepals free nearly to base.
 Capsule cylindric at base; seeds in upper part.
 One anther-cell below the other; fleshy mountain shrubs or herbs 18. FILETIA
 Anther-cells at equal height 19. ASYSTASIA
 Capsule conic, 4 seeds near base; stamens 4; anther-cells parallel 20. LEPIDAGATHIS
- Capsule 2- to 4-seeded; stamens 2.*
 Calyx 4-partite to base.
 Flowers showy, yellow or blue 21. BARLERIA
 Calyx 5-lobed.
 Corolla-tube slender cylindric; lobes sub-equal spreading. Showy shrubs or shrublets 22. PSEUDERANTHEMUM
- Capsule 4- or 2-seeded; stamens 2; corolla distinctly 2-lipped; seeds smooth hairy.*
 Anther-cell 1; corolla large, orange 23. CLINACANTHUS
 Anthers 2-celled; placentas rising elastically in capsule and ejecting seeds; one anther-cell below the other with a white tail; sepals 5.
 Flowers showy in axillary clusters 24. CALOPHANOIDES
 Flowers in terminal spikes or panicles.
 Shrub; flowers in condensed spikes; bracts small 25. GENDARUSSA
 Herbs. Flowers in spikes, racemes or panicles, small, yellow or white.
 Sepals 5; bracts single 26. JUSTICIA
 Sepals 4. Herb; flowers in dense spikes, pink; bracts single 27. ROSTELLARIA
 Sepals 5; slender herbs; flowers in dense spikes pink or blue; bracts 2.
 One anther-cell below the other but not tailed.
 Upper lip of corolla small, twisted 29. RHINACANTHUS
 Anther-cells at equal or nearly equal height not tailed.
 Corolla under 1 in. long; bracts small.
 Flowers in lax terminal spikes, yellow 30. PTYSSIGLOTTIS
 Flowers axillary, white 31. POLYTREMA
 Flowers in spike-like panicles; flowers small, white 32. SPHINCTACANTHUS
 Corolla over 1 in. long, greenish blue; bracts large 33. ECBOLIUM
 Corolla 25 in. long, pink; bracts large, ovate cuspidate 34. DICLIPTERA
 Flowers subtended by 2 bracts; corolla very unequally 2-lipped.
 Anther-cells 2, one above the other 35. PERISTROPHE
 Anther 1-celled 36. HYPOESTES

1. THUNBERGIA, Linn. fil.

Twining herbs and lianes. Leaves sub-equal. Peduncles axillary; flowers racemose. Bracts large broad oblong, base truncate.

Calyx obsolete, a mere rim, or with 8 to 12 teeth. Corolla showy, blue, white or orange; tube cylindric or campanulate; lobes 5, equal or lower lip little longer. Stamens 4; anther-cells linear spurred or not at base. Ovary 2-celled, 4-ovuled. Stigma-lobes triangular opposite. Capsule globose with a long oblong beak. Seeds 4 (3 or 2), hemispheric sessile. Species 100, chiefly African, fewer Asia to Australia.

Woody lianes; flowers large, blue; calyx a mere rim.

Leaves oblong or ovate, glabrous, hardly toothed . . . (1) *T. laurifolia*

Leaves triangular cordate pubescent, toothed . . . (2) *T. grandiflora*

Slender climbers; flowers white.

Leaves oblong or elliptic hastate (3) *T. fragrans*

Leaves oblong-lanceolate, base cuneate (4) *T. similis*

Flowers orange (5) *T. alata*



FIG. 126.—*Thunbergia laurifolia*.

(1) *T. laurifolia* Lindl. *Gard. Chron.* 1856, p. 260; Clarke in *Hook. fl. F.B.I.* iv. 392; *Bot. Mag. t.* 4985. *T. Harrisii* Hook. *Bot. Mag. t.* 4998.

A stout woody liane. Leaves broad oblong or ovate, glabrous entire or with a small lobe at the base, deep green, lower leaves broad at base and often undulate and toothed, upper ones lanceolate entire, 3 to 5 in. long, 1.5 to 2 in. wide; petioles 1 in. long. Cyme short, 1- to 3- or 4-flowered or terminal, several flowered. Bracts 1 in. long. Pedicels .5 in. long or little more. Calyx a mere rim. Corolla .1 in. across, bright, light blue, tube campanulate, limb wide. Capsule .25 in. long with a beak 1 in. long or more. *Hab.* Forests, climbing high on trees; in the north in open country shorter and climbing in hedges, Pahang, Kwala Tahan; Kwala Tekam (Evans). Perak, Gapis Pass (Curtis); Batang Padang

towards Jor; Kwala Kangsa; Sungkei and Goping (Kunstler); Lankawi, Kwah. Perlis, Kanga (a slender form in hedges; flowers deeper blue than usual); Kelantan, Kampong Kota (Gimlette); Kota Bharu and Chaning. *Distrib.* Burma. *Native name*: Akar Ketuah. *Use*: Leaves a medicine for boils (Gimlette).

(2) **T. grandiflora** Roxb. *Hort. Beng.* 45; *Clarke, l.c.* 631.

Tall climber with triangular cordate toothed leaves shortly hairy on both sides, larger than in *T. laurifolia* and light green; racemes hanging down several feet long, the bracts much broader and split to the base, all pubescent, the flowers larger, pale blue or white. It has run wild in Singapore, especially along Grange and Orchard roads. A native of India.

(3) **T. fragrans** Roxb. *Cor. Pl.* i. 47, t. 67; *Clarke, l.c.* 632.

Twiner. Leaves oblong or elliptic, base round or hastate, glabrous or nearly so, 3 in. long, 1 to 1.5 in. wide; petioles .25 to .5 in. long. Peduncles axillary, 1, rarely 2, 1 to 3 in. long. Flowers solitary, white. Calyx of 12 teeth; corolla, tube .5 to .75 in. long, limb 1 in. across, lobes obovate emarginate. Capsule sub-globose, .4 in. through, beak .8 in. long. Seeds 4. *Hab.* Singapore. Hedges, an escape from cultivation. Perlis, perhaps wild here. *Distrib.* India.

var. *javanica* King and Gamble, *l.c.* 632. Leaves beneath petioles and peduncles pubescent. Flowers slightly larger. *Hab.* Not rare near limestone rocks and in villages, certainly wild on the limestone, Selangor, Batu Caves. Pahang River at Kalang Kasai. Perak, Kwala Temengoh; Ulu Kenering (Wray), a very villous form. Lankawi (Curtis). Perlis. Kanga Kelantan, Chaning. *Distrib.* Java to Australia.

(4) **T. similis** Craib, *Kew Bulletin*, 1911, p. 434; var. *hirta* Ridley.

Slender twiner, rough hairy. Leaves rather thick, oblong to lanceolate, minutely apiculate, blunt, rounded at top, base cuneate, scabrid hairy; nerves 3, prominent from base; 2 in. long, .75 in. wide; petioles .3 in. long. Peduncles 2 in. long, slender hairy. Bracts lanceolate-acute hairy, .25 in. long. Corolla white; tube .25 in. long; limb .5 in. or more across. *Hab.* Very rare in open country, Setul heath (Ridley). *Distrib.* Siam.

The original plant is much larger in all parts with broad oblong leaves below and lanceolate acuminate narrow ones above, the flowers much larger and the whole plant nearly glabrous, the stem only sparsely hairy.

(5) **T. alata** Sims, *Bot. Mag.* t. 2591; *Clarke, l.c.* 632.

Habit of *T. fragrans*, but the leaves thicker ovate cordate; petioles thick winged, 2 in. long, all hairy. Corolla 1.25 in. across, orange with the mouth black, or orange yellow, mouth white, tube thicker than in *fragrans*. *Hab.* Hedges in Singapore, a common hedge plant now, native of Africa.

2. NELSONIA, R. Br.

An ascending hairy herb. Leaves sub-equal. Flowers small in small dense spikes. Bracts spiral or alternate. Calyx 2-lipped. Corolla-tube slender; limb 2-lipped. Stamens 2. Ovary 2-celled; ovules 8 in a cell arranged in two rows on a double placenta. Capsule ovoid conic with 8 to 16 seeds, no retinacula. Species 3 or 4, tropics.

(1) *N. campestris* R. Br. *Prodr.* 481; *Clarke, l.c.* 633.

Base creeping, ascending to 1 ft. and branching at top. Leaves oblong-ovate, nerves at least hairy, 2 in. long by 1 in. wide; petioles .75 in. long or less. Spikes .5 in. long on axillary, short branches with small sessile leaves. Bracts ovate acute, all white hairy. Corolla light blue and upper edge of lobes, middle purple brown violet, .15 in. long. Capsule .15 in. long. *Hab.* Open heathy country in the north and east coast, Pahang, Pekan. Penang, Balik Pulau (Deschamps); Pulau Betong (Curtis). Kedah, Alor Sta. Lankawi. Setul heath. Perlis, Tebing Tinggi (Ridley). *Distrib.* Africa, Burma, India, Australia.

3. STAUROGYNE, Wall.

Herbs or shrublets, base usually creeping, hairy. Leaves opposite, petioled. Flowers terminal or axillary in upper axils in racemes simple or paniced. Bracts wider than sepals. Sepals free nearly to base narrow, unequal, one larger than the other. Corolla-tube base narrow dilate upwards; lobes short, round, white or dark brown purple. Stamens 4, didynamous. Ovary oblong; style long, 2-branched. Capsule oblong, base ovoid acute, 2-celled, 2-valved. Seeds 12 to 20 in rows on the carpel edges. No retinacula. Species 50, most in Indo-Malaya, 10 in Brazil.

Sepals awned with a long bristly point; spikes dense.

- | | |
|--|-----------------------------|
| Spikes ovoid, 1 to 2 in. long; leaves 2 in. long . . . | (1) <i>S. setigera</i> |
| Spikes oblong, 1 to 2 in. long; leaves 4 to 5 in. long . . . | (2) <i>S. lanceolata</i> |
| Spikes several up to 3.5 in. long; sepals and bracts lanceolate . . . | (3) <i>S. malaccensis</i> |
| Spikes 2 to 3 in. long; sepals with bristly awns longer than corolla . . . | (4) <i>S. angustifolia</i> |
| Spikes 4 to 10 in. long; sepals with very long awns, glabrous . . . | (5) <i>S. Kingiana</i> |
| Spikes 4 to 10 in. long; sepals similar but hairy . . . | (6) <i>S. longifolia</i> |
| Sepals lanceolate acute. Racemes laxer. | |
| Racemes dense nodding, 1 to 3, 3 in. long, thick . . . | (7) <i>S. comosa</i> |
| Raceme lax few-flowered terminal erect . . . | (8) <i>S. pauper</i> |
| Racemes simple or paniced very long; flowers distant, very many . . . | (9) <i>S. lasiobotrys</i> |
| Racemes usually paniced, short; bracts broad; leaves round . . . | (10) <i>S. Griffithiana</i> |
| Sepals blunt, broad, hairy; leaves elliptic blunt . . . | (11) <i>S. arcuata</i> |

- Sepals blunt, broad, glabrous like the whole plant;
leaves lanceolate acuminate (12) *S. subglabra*
- Sepals very small, .12 in. long.
Leaves oblong, often cordate (13) *S. merguensis*
Leaves narrow lanceolate, raceme longer lax (14) *S. racemosa*
Corolla 1 in. long (15) *S. macrantha*
Corolla .75 in. long; leaves serrulate; stem
villous (16) *S. serrulata*
Corolla .75 in. long; leaves entire; plant
glabrous (17) *S. longispica*

(1) *S. setigera* Kuntze, *Revisio*, i. 497; *Clarke*, l.c. 635.

A weak herb, 4 to 12 in. long, creeping, ascending, pubescent. Leaves oblong-ovate or lanceolate, base shortly cuneate, tip blunt, .25 in. long, 1 in. wide or less, glabrous or minutely hairy; petioles .25 to 1.5 in. long. Spike solitary terminal ovoid dense, 6 in. long (in fruit to 1 in. long). Sepals linear sub-equal, .4 in. long, long acuminate edged with long hairs. Corolla .6 in. long, white with a dull pink spot in the mouth. Capsule .2 in. long. *Hab.* Woods; common. Singapore, Bukit Timah; Chua Chu Kang; Jurong. Johor, Batu Pahat; Tebrau River (a form with crowded undulate leaves). Malacca, Ayer Panas (Derry); Jus. Pahang, Kota Glanggi; Telom; Pulau Tioman (Burkill); Selangor, Kwala Lumpur (Curtis); Rawang. Dindings, Gunong Tunggal. Perak, Temengoh; Thaiping Waterfall (straggling tall form). Tringganu, Bundi (Rostados). *Distrib.* Sumatra, Java, Borneo. *Native name*: Pokoh Chechek Merah. *Use*: Leaves chewed for sore mouth.

(2) *S. lanceolata* Kuntze, *Revisio*, i. 497; *Clarke*, l.c. 636.

Stem woody, scurfy, not branched, 6 to 14 in. long. Leaves lanceolate, glabrate, scurfy on nerves, 4 to 5 in. long, .6 to 1 in. wide or smaller; petioles .25 to 4 in. long. Spike 1 in. long (in fruit 1.5 to 2 in. long), laxer than in *setigera*. Sepals lanceolate acute, not hairy. Corolla hairy outside white with pink mouth. *Hab.* Rare in forests, Pahang, Tahan River. Malacca, Ayer Panas (Derry). Negri Sembilan, Bukit Temiang (Cantley). *Distrib.* Java. *Native name*: Bunga Batu. *Distrib.* Tenasserim, Java.

(3) *S. malaccensis* Clarke, l.c. 636.

Herb 4 to 8 in. tall, branched or not. Stem hairy. Leaves elliptic-lanceolate, blunt, base cuneate glabrous (except the scurfy nerves), 4 in. long, 1 in. wide or less; petioles .5 to 1 in. long. Spikes 1 to 4 or even 8 on the top, 1 to 1.5 in. long, dense, in fruit 3.5 in. long. Bracts oblong. Sepals .4 in. long, very unequal, biggest lanceolate-acuminate, strongly keeled, the others linear acuminate setaceous all long-hairy. Corolla .6 in. long, nearly glabrous. *Hab.* Woods, not rare. Johor, Gunong Pulai and Gunong Pantai. Malacca (Griffith); Sungei Hudang. Negri Sembilan, Bukit Kayu Arang, and Bukit Surawan (Cantley). Province Wellesley, Tasek Gelugur. Lankawi (Curtis). Kedah, Gunong Geriang. Perlis, Tebing Tinggi (Ridley). *Distrib.* Tenasserim, Java.

(4) *S. angustifolia* Wall. *Pl. As. Rar.* ii. 81; *Clarke, l.c.* 636.

Stem 8 to 12 in. long, little or not branched, base woody, hairy. Leaves glabrous lanceolate, sub-acute, base narrowed, 3 to 4 in. long, .7 to 1 in. wide; petioles 1 to 2 in. long. Spikes terminal and axillary ellipsoid, dense, in fruit up to 3 in. long. Bract narrow-oblong, aristate, hairy below. Sepals unequal, longest .6 in. long, base lanceolate, hairy above glabrous, long-awned. Corolla .6 in. long, hairy outside. Capsule .2 in. long. *Hab.* Not common in lowland forests, Malacca, Ayer Panas (Good-enough). Selangor, Ulu Gombak. Perak, Ipoh (Curtis); Bujong Malacca. *Distrib.* Mergui, Tavoy.

(5) *S. Kingiana* Clarke, *l.c.* 637.

Stem pubescent, 2 to 3 ft. tall. Leaves glabrous, elliptic narrowed at both ends, 8.5 in. long, 2 to 3 in. wide or less; petioles 1 to 2 in. long. Spikes 3 to 6 on a stem, terminal and axillary, 4 to 10 in. long, dense. Bracts linear, .8 in. long. Sepals nearly equal, linear, longest .75 in. long, base little dilate and hairy, above glabrous. Corolla 1 in. long, yellowish white, tube maroon inside, glabrous. Capsule .2 in. long, rather corky. *Hab.* Hill woods. Johor, road to Gunong Pulai; Gunong Janeng (Kelsall); Gunong Pantai (Kunstler). Pahang, Tahan River; Kwala Teku. Selangor, Klang Gates; Ulu Gombak. Tringganu, Bundi (Rostados). Kelantan, Kwala Aring (Yapp). *Distrib.* Lingga.

(6) *S. longifolia* Kuntze, *Revisio*, i. 497; *Clarke, l.c.* 637.

Sub-erect, 8 to 20 in. tall. Stem woody in large plants and branched. Leaves lanceolate, narrowed at both ends, glabrous; nerves scurfy on the back, pale beneath, 4 to 5 in. long, .5 to .75 in. or a little wider; petioles 1 to 1.5 in. long, slender. Spikes shortly peduncled or sessile, terminal and in upper axils, in fruit 2 to 5 in. long. Bract narrow lanceolate, awned, .6 in. long. Sepals linear, longest .5 in. long, all softly hairy. Corolla-tube cylindric then abruptly dilate, .5 in. long, white with purple mouth. Capsule .2 in. long. *Hab.* Woods in mountain districts up to 4000 ft. altitude. Johor, Gunong Muntahar (Kloss). Pahang, Tahan River. Negri Sembilan, Perhentian Tinggi. Selangor, Kwang; Kwala Lumpur; Semangkok; Bukit Kutu. Perak, Temengoh; Tapah (Ridley).

var. *condensata* Ridl. Leaves very narrow, spikes dense, compact in a head. Bracts very hairy. Kelantan, Kwala Lebir (Gimlette).

(7) *S. comosa* Kuntze, *Revisio*, i. 497; *Clarke, l.c.* 638.

Stem 1 to 3 ft. tall, woody below, hairy. Leaves elliptic-lanceolate, narrowed to both ends, glabrous except nerves beneath, appressed hairy, 6 in. long, 2 to 2.75 in. wide; petioles 1 to 2 in. long. Spikes 1 to 3, nodding, 2 in. long, lengthening to 7 in. in fruit; at first dense, rough white hairy. Bracts lanceolate-acuminate. Sepals unequal, the largest lanceolate-acuminate, .3 in.

long, others narrow linear, all white-hairy. Corolla hairy purple, .5 in. long, trumpet-shaped. Capsule .2 in. long. *Hab.* Hill woods, Selangor, Sungei Buluh; Rawang; Semangkok. Perak, Hermitage Hill; Bukit Kapayung, Sungei Siput; Relau Tujur (Wray); Sira Rimau, Gunong Inas (Yapp); Penang (Wallich). *Native name:* Poko Ekor Landak.

(8) **S. pauper** Clarke, *l.c.* 639.

A slender erect herb 18 in. to 3 ft. tall, glabrous except inflorescence with about 4 pairs of distant leaves. Leaves lanceolate, thin, long abruptly narrowed at tip, base short cuneate; nerves about 5 pairs; 3 in. long, 1.5 to 1.75 in. wide; petioles .2 in. long. Panicle terminal lax erect, 3 in. long with few distant short branches, hairy. Bracts linear acuminate. Flowers pedicelled. Sepals linear acuminate, .25 in. long, all hairy. Corolla curved hairy, base narrow, abrupt dilate above, pale yellow with dark stripes. *Hab.* Perak, Larut at 200 ft. altitude (Kunstler). Rare.

(9) **S. lasiobotrys** Kuntze, *Revisio*, i. 497; Clarke, *l.c.* 639.

Half shrubby, 2 to 3 ft. or shorter, hairy. Leaves glabrous, thin elliptic short blunt acuminate and narrowed to base, 4 in. long by 1.75 in. across or less; petioles 1 to 3 in. long. Racemes axillary and forming a terminal panicle often of seven branches, 4 to 6 in. long, slender; flowers distant on pedicels .1 in. long, all hairy. Bracts .35 in. long, linear-acuminate. Sepals similar, unequal. Corolla curved gradually dilate upwards, pink, glabrous. Capsule oblong, .25 in. long. *Hab.* Mountain woods, not rare, Pulau Tioman (Burkill). Negri Sembilan, Bukit Tangga (Napier). Selangor, Ginting Bidai. Perak, Ulu Temengoh; Hermitage Hill; Thaiping Hills, Gunong Hijau; Waterloo (Curtis). Lankawi, Kwah (Curtis). Kelantan, Kwala Lebir. *Distrib.* Moulmein.

(10) **S. Griffithiana** Kuntze, *Revisio*, i. 497; Clarke, *l.c.* 640.

Stem 4 to 8 in. long, creeping and ascending. Leaves closely appressed hairy above, broad elliptic or ovate, tip rounded, base round or cordate, 4.5 in. long, 3 in. wide; petioles .5 to 2 in. long. Raceme 1 or several paniced, 2 to 5 in. long, nearly glabrous. Bracts, lower elliptic blunt, upper ones narrow. Sepals linear, tips filiform sparsely hairy. Corolla .6 in. long, cylindric white. Capsule oblong, .2 in. long. *Hab.* Not rare in forests. Singapore, Bukit Timah; Kranji; Sungei Buluh. Johor, Gunong Pantai. Pahang, Tahan River; Pulau Tioman (Burkill). Malacca, Bukit Sadanen (Derry). Negri Sembilan, Bukit Sulu; Bukit Putus. Selangor, Ginting Bidai (Kloss). Perak, Temengoh. Kelantan, Kwala Aring (Yapp).

(11) **S. arcuata** Clarke, *l.c.* 640.

Stem 4 to 8 in. long, creeping ascending. Leaves 2 pairs or more, sparsely hairy, ovate or elliptic, blunt, base round or shortly cuneate, 4.5 in. long, 2.5 in. wide; petioles .5 to 1.5 in. long. Spikes 1 to 3, curved; flowers about 10, secund, in fruit about

3 in. long. Bracts, lower ones oblong broad, upper ones linear, about .25 in. long, hairy. Corolla cylindric hairy maroon-brown, lobes red. Capsule oblong, .2 in. long. *Hab.* Mountain woods, local, Pahang, Telom (Ridley). Perak, Temengoh; Thaiping Hills 2500 ft. altitude upwards (all collectors).

(12) *S. subglabra* Clarke, *l.c.* 640.

Stem erect, 6 to 12 in. long, glabrous. Leaves elliptic-lanceolate narrowed to both ends, sub-acute, 4.5 in. long, 1 to 1.25 in. wide, thin glabrous; petioles .5 to 1 in. long. Raceme terminal and axillary (one or two) slender, 3 to 8 in. long; flowers second distant; pedicels up to .15 in. long; lower bracts leaf-like oblong, nerved, upper narrow. Sepals .5 in. long, lanceolate-linear blunt glabrous. Corolla .6 in. long, gradually dilate from base, broad glabrous, pure white or with pink lobes. Capsule oblong, .2 in. long. *Hab.* Mountain forests up to 5500 ft. altitude. Selangor, Gunong Mengkuang Lebah (Robinson). Pahang, Telom. Perak, Thaiping Hills to top (all collectors). Kedah Peak, in the lower woods (Ridley). *Distrib.* Borneo.

(13) *S. merguensis* Kuntze, *Revisio*, i. 497; Clarke, *l.c.* 641.

Stem erect (creeping at base) pubescent, about 2 to 4 in. tall. Leaves crowded at apex or stem oblong tip round, base round and generally cordate, glabrous (or nearly) on upper side; nerves and reticulations conspicuous, beneath pubescent; 2 to 5 in. long, 1.5 to 2 in. wide; petioles .5 to 1.5 in. long. Racemes solitary or paniced, slender, 3 to 6 in. long, pubescent; flowers small, distant. Bracts narrow linear acuminate, .1 in. long. Corolla purple, .15 in. long, glabrous. Capsule .25 in. long. *Hab.* Rare in forests. Perak, Ulu Selama (Wray); Ulu Temengoh. Kedah, Gunong Bintang (Kloss); Kelantan, Chaning Woods. Lankawi, Dayong Bunting (Robinson, very small form). *Distrib.* Mergui.

The Malay Peninsula plants are usually much larger than the Mergui specimens.

(14) *S. racemosa* Kuntze, *Revisio*, i. 497; Clarke, *l.c.* 641.

Erect shrublet, usually 6 to 12 in. tall, pubescent. Leaves lanceolate acuminate narrowed to base, 4 in. long, 1.25 in. wide; petioles .5 to 1.5 in. long. Racemes 1 or more or often paniced, base nude for about 4 in., above branched or floriferous, for 3 or more in., pubescent. Flowers rather distant, very short-pedicelled, numerous, opening 1 or 2 at a time. Bracts very small lanceolate. Sepals short, lanceolate. Corolla cylindric, hardly narrowed at base, .5 in. long, white at base, purple brown at top. Capsule .2 in. long. *Hab.* Penang Hill abundant at about 2000 ft. altitude upwards in forest path edges (all collectors). *Distrib.* Sumatra.

Clarke, *l.c.* gives Malacca (Griffith), Singapore (Walker), and Moulmein, and Java (Lobb) as localities. The Malacca specimen is only from Wight's herbarium, and the locality extremely doubtful. Walker collected in Penang

as well as Singapore, and labelled his specimens "Singapore and Penang." Lobb's specimens are doubtless from Penang, where he collected. The plant appears here to be strictly confined to the upper part of Penang Hill, where it is abundant and conspicuous, but has once been collected in Sumatra at Indragiri by Curtis.

(15) *S. macrantha* Clarke, l.c. 642.

Stem 3 to 4 ft. tall, villous. Leaves elliptic-lanceolate, subacute, base cuneate, sparsely hairy above, 4.5 in. long, 1.75 in. wide; petioles .25 to 1 in. long, villous. Peduncles 2, villous, 3 in. long with small few-flowered panicles. Bracts .2 in. long, linear, very hairy. Sepals sub-equal, .175 in. long, linear, very hairy. Corolla 1 in. long, pubescent. *Hab.* Perak, Larut 4500 to 5000 ft. altitude (Kunstler). Rare.

(16) *S. serrulata* Clarke, l.c. 642.

Stem elongate, villous upwards. Leaves elliptic-acuminate at both ends, edges closely serrulate, pubescent all over, 4 to 5 in. long, 1.75 in. wide; petioles .5 to 1 in. long, villous. Peduncles 4 from upper axils, 4 in. long, villous. Inflorescence 12- to 18-flowered, lax, pubescent. Bracts hardly .125 in. long, linear. Calyx .125 in. long. Corolla .75 in. long, white, nearly straight. *Hab.* Perak, Ulu Batang Padang (Wray). Rare.

(17) *S. longispica* (Ebermaiera) Ridl. *Journ. Roy. As. Soc. S. Br.* 86, p. 303.

Herb over 1 ft. tall, glabrous. Leaves thin broad lanceolate narrowed to both ends; nerves 18 pairs, parallel; 6 in. long, 2 in. wide; petioles slender, 2 in. long. Racemes solitary or 2 to 4 in a panicle with the peduncle 3 in. long. Flowers numerous distant. Bracts ovate or oblong blunt foliaceous, petioled, .25 in. long, .12 in. wide. Pedicels .1 in. long. Sepals lanceolate acuminate. Corolla .75 in. long, tube narrow cylindric, gradually dilate above, dull pink, .25 in. long, limb .5 in. long, lobes blunt, .1 in. long, white. Stamens 4, shorter than tube. Capsule oblong, .15 in. long. *Hab.* Mountain woods. Negri Sembilan, Bukit Tangga. Selangor, Ulu Gombak (Ridley).

4. RUELLIA, Linn.

Herbs (or shrublets. Leaves opposite equal. Flowers axillary or paniced). Bracts 0. Bracteole longer than calyx, foliaceous or spatulate. Calyx deep 5-cleft, lobes linear. Corolla tubular ventricose violet (blue or white or red), lobes round. Stamens 4, didynamous; anther-cells oblong parallel. Ovary glabrous. Capsule club-shaped, base sterile solid, top ellipsoid. Seeds 6 or more ovoid, flat; retinacula hooked. Species upwards of 200, chiefly South American. Several of the latter are cultivated in gardens.

R. tuberosa has run wild along roadsides in Province Wellesley, as it has done elsewhere in Asia. It has stems about 1 ft. tall with oblanceolate leaves 3 in. long and terminal cymes of large,

light blue flowers; corolla 2 in. long, 1.5 in. across. Capsule cylindric terete, 1.5 in. long. It is a native of America.

Small herbs; stems elongate slender; leaves lanceolate cuneate at base; flowers .75 in. long, pale lavender with 2 dark spots (1) *R. repens*

Stems creeping; leaves ovate broad-based; corolla 1.25 in. long, violet (2) *R. prostrata*

(1) *R. repens* Linn. *Mant.* 89; *Clarke, l.c.* 648.

Slender weak sarmentose herb, branched. Leaves lanceolate pubescent, narrowed at base often quite narrow, 1 to 2 in. long, .2 to .5 in. wide; petioles .15 to .2 in. long. Flowers usually solitary axillary sessile. Calyx .2 in. long, lobes linear hairy. Corolla .75 in. long, .3 in. across mouth. Capsule .3 in. long, club-shaped beak acute. Seeds 5 to 8. *Hab.* Common in grassy spots; Singapore, Gardens; Bajau; Pulau Damar. Pahang, Sungei Chenei (Fox). Malacca, Chabau (Cantley); Panchur (Good-enough). Selangor, Kwala Lumpur. Perak (Scortechini). Penang, Waterfall, common. Kedah, Gunong Geriang; Alor Sta. Kelantan, Kota Bharu.

var. *linearis* Clarke, *l.c.* 649. Leaves longer and narrower, 2.25 in. long, .2 to .25 in. wide, Pahang, Sungei Tahan. Perak, Ipoh (Deschamps). *Distrib.* Indo-Malaya, China. *Native names*: Dras Malam; Akar Kurumak. *Use*: Rubbed on the body for heavy perspiration and restlessness at night in children.

(2) *R. prostrata* Lam. *Encycl.* vi. 349.

Creeping herb. Leaves ovate, base rounded acute, pubescent, 1 in. long, .4 in. wide or less; petioles slender, .3 in. long or less. Flowers solitary, sessile. Sepals linear long-acuminate, hairy. Corolla gradually dilate upwards, 1.25 in. long, .5 in. wide at mouth, violet. Capsule .75 in. long, pubescent. *Hab.* Kedah, abundant on the seashore on Pulau Song Song (Ridley). *Distrib.* Indo-Malaya.

Clarke lumps this species, very distinct in habit (it creeps on the ground in masses), shape of leaves, size and colour of flowers and size of fruit, as a mere form of *R. repens*. No two species could be more dissimilar. I have only once met with it in the Malay Peninsula.

5. APORUELLIA, Clarke

Clarke separated this genus from *Ruellia* merely on account of the pollen grains not being honeycombed, but more or less prickly. It would be better to make it a section of *Ruellia*. Species 5 or 6, Malayan, South China, Australia.

Leaves at base large; stem 1 ft. tall with few leaves; flowers in long-peduncled spikes, white. (1) *A. sumatrensis*
Leaves in scattered pairs on stem; flowers axillary, blue (2) *A. axillaris*

(1) *A. sumatrensis* Clarke, *l.c.* 650; var. *Ridleyi* Clarke, *l.c.*
Leaves at base oblong-obovate, tip rounded sparsely puberulous,

base narrowed, 5 in. long, 1.5 in. wide; petioles 1.5 in. long; stem above radical leaves about 11 in. long, with few small leaves. Flowers in remote, small clusters on long-peduncled spikes, pure white. Bracts obovate pubescent. Calyx of 5 deep linear teeth, .125 in. long. Corolla .35 in. long; tube slender. Stamens 4. Capsule .6 in. long, seed-bearing to base. Seeds 12, ovate shaggy. *Hab.* Rare on limestone rocks; very local. Selangor, Batu Caves (Curtis, Ridley). *Distrib.* Sumatra (type form).

(2) **A. axillaris** Clarke, l.c. 650.

Branches 1 ft. long. Leaves ovate-triangular, sub-obtuse, slightly hairy, suddenly attenuate at base, pairs 2 in. apart, 3.25 in. long, 1.5 in. wide; petioles .25 in. long. Flowers blue in clusters of 1 to 3 in axils with oblong bracts, .25 to .35 in. long. Sepals linear, .2 in. long, pubescent. Corolla .8 in. long, narrow, funnel-shaped. Capsule .5 in. long with 7 flattened seeds. Pahang, Pulau Chengai; Pahang River. Perlis, Kanga (Ridley). *Distrib.* Tongka.

This closely resembles *Ruellia prostrata* var. *dejecta*, only differing in the pollen. In habit, etc., it is utterly different from *A. sumatrensis*.

6. HYGROPHILA, R. Br.

Marsh herbs 1 to 5 ft. tall, strict; stems 4-angled. Leaves opposite, equal. Flowers in axillary clusters, rarely in continuous spikes. Calyx with 5 (or 4) acute teeth, tubular below. Corolla 2-lipped, funnel-shaped, dilate above, medium-sized, upper lip emarginate, lower trifid, violet or white. Stamens 4, didynamous except in *H. polysperma*. Ovary oblong; style with 1 linear branch, the other rudimentary. Capsule linear-oblong. Seeds 8 to 80, ovoid. Species 40, whole tropics.

Unarmed.

Flowers in terminal spikes; stamens 2 . . . (1) **H. polysperma**

Flowers in axillary clusters; stamens 4.

Leaves lanceolate or linear.

Tall plant, clusters many-flowered . . . (2) **H. angustifolia**

Dwarf rock plant, clusters 1- to 3-flowered . . . (3) **H. saxatilis**

Leaves obovate or oblong petioled.

Corolla small, .25 to .35 in. long; bracts short, broad . . . (4) **H. meianthos**

Corolla .5 to .8 in. long.

Plant nearly glabrous . . . (5) **H. quadrivalvis**

Plant softly hairy all over . . . (6) **H. phlomoides**

Leaves oblong sessile, stiff hairy; nerves prominent beneath . . . (7) **H. subsessilis**

Armed with strong spines.

Flowers 1 in. long in whorls . . . (8) **H. spinosa**

(1) **H. polysperma** T. Anders. Journ. Linn. Soc. ix, 456; Clarke, l.c. 644.

A small procumbent plant sparsely pubescent, 4 to 8 in. tall. Leaves oblong or elliptic, base narrowed, tip blunt, 1 in. long,

.5 in. wide. Spikes terminal, dense, 1 to 2.5 in. long. Bracts .25 to .35 in. long, elliptic. Calyx divided nearly to base, lobes linear. Corolla .35 in. long, pubescent, pale blue or white. Stamens 2. Capsule .25 to .35 in. long, hairy towards the top. Seeds 20 to 32, orbicular. *Hab.* Malacca (Griffith). *Distrib.* India, Cambodia.

(2) *H. angustifolia* R. Br. *Prodr.* 479; *Clarke, l.c.* 644.

Stems 2 ft. tall, base decumbent. Leaves lanceolate alternate both ends, glabrous, 3 in. long, .7 in. wide; petioles .25 in. long. Flowers in dense axillary clusters. Bracts .25 in. long, elliptic. Calyx .35 to .5 in. long, lobes triangular-linear less than half as long as tube, hairy or nearly glabrous. Corolla .5 to .7 in. long, pale violet. Stamens 4. Capsule .5 to .7 in. long. Seeds 20 to 28. *Hab.* Common in wet spots in open country, Johor, Kota Tinggi. Pahang, Pekan. Selangor, Kwala Lumpur (Curtis); Batu Caves. Negri Sembilan, Linsum. Tringganu, Bundi (Ros-tados) a variety with bracts and calyx very hispid. Kelantan, Kamposa. *Distrib.* South India, Malaya, China. *Native name:* Kerma Batu.

(3) *H. saxatilis* Ridl. *Trans. Linn. Soc.* iii. 333; *Clarke, l.c.* 645.

A dwarf tufted plant 6 to 14 in. tall. Leaves crowded linear, base narrowed, sessile, glabrous, 1 to 1.5 in. long, .175 to .2 in. wide. Flowers axillary, 1 to 3 together. Calyx-lobes linear with white hairs on the edge. Corolla white, blue inside, .35 in. long. Capsule .3 in. long. *Hab.* In cracks in rocks in streams, mountain districts. Pahang, Tahan River. Perak, Temengoh. Kelantan, Galas River (Ridley); Kwala Aring (Yapp). *Distrib.* Cambodia, Borneo, Ceylon.

(4) *H. meianthos* Clarke, *l.c.* 645.

Plant robust, ascending, branched, over 1 ft. tall. Leaves obovate obtuse, .5 to 1.25 in. long; petioles .5 in. long. Flowers rather few in axillary whorls. Calyx .25 in. long, divided into triangular lobes about half-way down, covered all over with stiff white hairs. Corolla .25 to .35 in. long, white edged violet. Capsule .35 in. long, blunt. *Hab.* Wet grassy marshes, not common. Perhaps only a poor variety of *H. quadrivalvis*. Singapore, Botanic Gardens. Malacca (Maingay).

(5) *H. quadrivalvis* Nees, *Wall. Pl. As. Rar.* iii. 80; *Clarke, l.c.* 645.

A robust plant 3 to 4 ft. tall, branched. Leaves oblong-obovate narrowed to base, tip round, glabrous except ciliate edge, 1.5 to 2 in. long, .36 in. wide, occasionally crenulate; petioles .1 in. long. Flowers in axillary clusters, few. Bracts and calyx glabrous. Calyx-lobes very short, .05 in. long, tube .25 in. long. Corolla .5 in. long, tube and upper lip white, lower lip lobes violet edged white, centre lobe white; in the throat on lower lip, 2 raised

palates grooved white, tipped yellow, dotted purple with a red hair in each dot. Capsule .5 to .8 in. long. *Hab.* Common in wet spots. Singapore, Ang Mo Kio; Bukit Timah (Hullett); Malacca, Bukit Panchur (Cantley); Negri Sembilan, Bukit Sulu (Cantley). Selangor, Salak south (Seimund). Perak, Teluk Anson (Kunstler). Province Wellesley, Nibong Tebal. Penang (Curtis, Deschamps). Kelantan, Gunong Geriang. Perlis, Tebing Tinggi. *Distrib.* India, Cambodia, Malay isles.

(6) *H. phlomoides* Nees, *Wall. Pl. As. Rar.* iii. 80; *Clarke, l.c.* 646.

About 3 ft. tall, branched and usually softly hairy. Leaves obovate blunt or rounded soft hairy, 1 to 4 in. long, .5 in. across; petioles .25 in. long. Flowers rather numerous in axillary heads. Bracts lanceolate blunt. Calyx .25 in. long, both densely white hairy. Corolla all violet, lower lip darker. *Hab.* Common in wet spots. Singapore, edge of garden lake; Alexandra Road; Reservoir. Pahang, Kuantan (Fox). Malacca, Ayer Panas (Cantley). Selangor, Pudoh; Semangkok Pass; Batu Caves. Negri Sembilan, Bukit Sulu (Cantley). Perak, Jenah (Wray). Province Wellesley, Permatang Bertam. *Distrib.* India, Cambodia, Borneo, Philippines. *Native name*: Chukal. *Use*: For poulticing boils.

var. *angusta* Ridl. Leaves narrow linear-lanceolate, 1.5 in. long, .25 in. wide, glabrous. Sepals and bracts white hairy. *Hab.* Wet woods in low-lying country, Kelantan, Glam Woods, Kota Bharu (Ridley).

This variety has the leaves of *H. salicifolia* and inflorescence of *H. phlomoides*.

var. *Roxburghii* Clarke in *Hook. fl. F.B.I.* iv. 408; *l.c.* 646. Smaller and often procumbent, more divided. Leaves 1 to 2 in. long, often scabrid pubescent. Penang (Deschamps). *Distrib.* Chittagong to Philippines. Apparently a poor and more hairy state.

(7) *H. subsessilis* Clarke, *l.c.* 646.

Stiff plant over 1 ft. tall; stem hairy at top at least and 4-angled. Leaves rigid oblanceolate blunt sessile, hairy all over, strongly nerved, 1.5 in. long. Calyx longer, lobes lanceolate acuminate, all hairy. Corolla .5 in. long, pubescent. *Hab.* Malacca (Hervey). Very rare.

(8) *H. spinosa* T. Anders. *Thwaites, Enum. Pl. Zeyl.* 225; *Clarke, l.c.* 646.

A stout plant 2 to 5 ft. tall. Leaves lanceolate to linear, hairy sessile, 3 to 6 in. long, .5 in. wide. Flowers in large axillary clusters armed with strong orange-coloured spines 1 in. long. Bracts .5 to 1 in. long, lanceolate. Calyx .35 to .5 in. long, divided nearly to base in 4 lobes. Corolla 1 in. long, pale purple. Capsule .35 in. long, linear-oblong, 4- to 8-seeded. *Hab.* Singapore (Kunstler).

Possibly an accidental weed, not seen here again. *Distrib.* India and Africa.

7. *NOMAPHILA*, Blume

Herb; leaves lanceolate. Racemes axillary, many-flowered. Flowers secund, blue. Bracts small or 0. Calyx deeply divided into 5 lobes. Corolla blue; tube narrow then dilate. Stamens 4. Capsule slender, dehiscent into 2 recurved valves. Seeds numerous ovoid. Species about 12, Africa and Asia.

(1) *N. stricta* Nees, *DC. Prodr.* xi. 84; *Clarke, l.c.* 647.

Branched nearly glabrous, 1 to 3 ft. tall. Leaves narrow elliptic, attenuate at each end, glabrous above, pubescent on nerves or all over beneath, 3 to 4.5 in. long, 1.5 in. wide; petioles 3 in. long or less, slender. Racemes or corymbs numerous, 3 in. long. Calyx .25 to .35 in. long, lobes linear. Corolla .5 in. long, bright blue. Capsule .36 in. long. *Hab.* Common in muddy river banks, Johor, Batu Pahat; Kota Tinggi. Perak, Perak River (Kunstler); Kurau (Wray); Ipoh (Curtis); Kuala Dipang. Perlis, Kanga (Ridley).

var. *minor*, *N. minor* Clarke, *l.c.* 648, rather smaller in all parts, glabrous. *Distrib.* Perak, Krian (Scortechini).

var. *corymbosa*, *N. corymbosa* Bl. *Bijdr.* 804. Much reduced and viscid, hairy all over. Perlis, Kanga, in a dried-up rice field. *Distrib.* Malay islands. All these varieties and some more appear to me merely variations due to the dryness or dampness of locality.

8. *STENOTHYRSUS*, C. B. Clarke

Tall herb, glabrous. Leaves rather stiff lanceolate acuminate. Inflorescence a terminal spike of whorls of flowers on a long peduncle with 2 ovate leaves about the middle. Sepals linear. Corolla-tube cylindric narrow, campanulate above, blue. Stamens 4, in pairs. Style thinly hairy, lobe 1 oblong linear, the other suppressed. Capsule narrow ellipsoid, seed-bearing from base. Seeds 8. Species 1.

(1) *S. Ridleyi* Clarke, *l.c.* 651.

Stem rather tall. Leaves glabrous, long narrowed to base, 4 in. long, 1.5 in. wide; petioles 2 in. long. Peduncle 6 to 7 in. long, ovate leaves 1.5 in. long, .75 in. wide. Spikes 6 in. long of opposite short cymes of 6 or 7 flowers. Calyx .175 in. long. Corolla 1 to 1.5 in. long, bright blue, pubescent. *Hab.* Local, Limestone rocks. Perak, Tambun; Ipoh (Curtis, Ridley).

9. *HEMIGRAPHIS*, Nees

Herbs or shrublets, usually hairy. Leaves often crenate. Spikes terminal or in small axillary heads on axillary peduncles. Bracts usually large, lanceolate or ovate. Sepals lanceolate-linear.

Corolla tubular-campanulate, blue or white; lobes twisted in bud. Stamens 4; anther-cells oblong, sub-parallel. Ovary oblong; ovules 6 to 12. Capsule oblong or linear-obovoid hardly stalked. Seeds 6 to 12, ovoid, hairy on edge. Species about 30, Indo-Malaya to Polynesia.

Creeping plants.

- Flowers 1 to 3 together in small axillary peduncled heads (1) *H. Ridleyi*
 Flowers 1, terminal (2) *H. hispida*

Erect plants.

- Flowers in loose spikes; sepals ligulate triangular hairy.
 Leaves nearly glabrous (3) *H. confinis*
 Leaves hairy var. *hirsuta*
 Sepals linear-subulate white-hispid.
 Capsule nearly terete, .25 in. long (4) *H. alternata*
 Capsule more than .25 in. long, obovoid flattened (5) *H. platycarpus*

(1) *H. Ridleyi* Clarke, l.c. 652.

Creeping plant, pubescent. Leaves equal, ovate-elliptic, acute, crenate, hairy above, 2 in. long, 1 in. wide; petioles .25 to .35 in. long. Flowers 1 to 3 in small heads on axillary peduncles .175 to .25 in. long. Bracts oblong, .35 in. long. Bracteoles linear, hardly half as long as calyx. Calyx .175 in. long; sepals lanceolate-linear, hairy. Corolla .5 in. long, light blue. Stamens hairy. *Hab.* Open country, banks and grassy spots. Pahang, Kwala Tembeling. Perak, Kwala Temengoh; Kwala Kangsa. Kedah, Gunong Geriang. Perlis, Kanga. Kelantan, Chaning; Kota Bharu (Ridley). *Distrib.* Bangtaphan.

(2) *H. hispida* Craib, *Kew Bulletin*, 1913, p. 203.

Prostrate creeping plant hairy all over, with white hairs. Leaves opposite, ovate-lanceolate or ovate blunt, edge bluntly serrate; nerves 6 pairs elevate beneath, thickly white hairy; 1.25 in. long, 1 in. wide; petioles .4 in. long, thickly hairy. Flowers solitary, terminal. Sepals lanceolate-linear, white hairy. Corolla purple, tube .2 in. long; limb .12 in. wide, oblong round. Stamens glabrous. Ovary puberulous above; ovules 8. *Hab.* Kelantan, Kwala Aring (Yapp). *Distrib.* Siam.

(3) *H. confinis* T. Anders. *Journ. Linn. Soc.* ix, 463; Clarke, l.c. 652.

Erect branched, 2 ft. tall, white hairy. Leaves elliptic narrowed to both ends, acute, crenate, nearly glabrous, 3 to nearly 4 in. long, 1 to 1.5 in. wide; petioles .25 to .5 in. long. Spikes terminal, cylindric, 1 to 2 in. long, thick. Bracts .5 in. long, ovate, obovate or elliptic, bracteoles linear. Calyx .35 in. long soft hairy, lobes ligulate. Corolla .5 in. long, white veined pink. Capsule .25 in. long, slightly flattened, 8-seeded nearly from base. *Hab.* Open country, roadsides. Malacca, Merlimau (Cantley, Ridley). Negri Sembilan, Bumban (Cantley). *Distrib.* Borneo.

var. *hirsuta*. *H. hirsuta* Anders. Clarke, *l.c.* A very hairy form with the leaves hairy all over and more crenulate. Malacca (Ridley). *Distrib.* Java (var. *hirsuta*) and Borneo. *Native names*: Kusom bukit; Ruku Ruku jantan.

(4) *H. alternata* T. Anders. *Journ. Linn. Soc.* vii. 114; Clarke, *l.c.* 653; *Ridl. Journ. Roy. As. Soc. S. Br.* 59, p. 148.

Stem slender, glabrous except young parts branched, leafy at top, little branched, 3 in. to 1 ft. tall. Leaves lanceolate acuminate both ends, sub-coriaceous; nerves prominent, quite glabrous when adult; 1 to 3 in. long, .5 to .75 in. wide. Spikes .5 to 1.5 in. long, dense. Bracts spathulate-ovate acute, white hairy. Sepals lorate blunt hairy. Corolla .25 in. long, white, glabrous except mouth, white-hairy. Capsule .25 in. long, oblong beaked shortly. *Hab.* Open places, Johor, Tebing Tinggi. Pahang, Pekan. Perak, Ulu Temengoh. Kedah, Alor Sta. Setul heath. Perlis, Kanga (Ridley). *Distrib.* Java, Sumatra.

(5) *H. platycarpus* Clarke, *l.c.* 653.

Herb about 12 in. tall, sub-glabrous; young parts white-hairy. Leaves elliptic-lanceolate, sub-acute, base cuneate, midrib on back hairy obscurely crenulate, 1 to 3.5 in. long, .2 to 1.5 in. wide; petioles .1 in. long. Spikes terminal and axillary, 3 in. long, thick. Bracts ovate acute, silky hairy on edge, .25 in. long, .18 in. wide. Corolla .24 in. long, blue, funnel-shaped, glabrous. Capsule .25 in. long, linear-obovate, flattened, sterile at base. Seeds 8. *Hab.* Not rare. Open pastures, Johor, Kwala Kahang (Kelsall); Batu Pahat. Pahang, Pekan. Negri Sembilan, Bukit Kajang (Cantley). Lankawi. Kedah, Alor Sta (Ridley). *Native name*: Dilam.

10. ENDOPOGON, Nees

Branched herb with leaves opposite unequal elliptic. Spikes pendulous strobilate, green with elliptic large bracts. Flowers in pairs. Species 20, India.

(1) *E. Ridleyi* Clarke, *l.c.* 654.

Stems pubescent, about 1 ft. tall. Leaves elliptic, very unequal, acuminate narrowed to base, glabrous, 4 to 6 in. long, 1 to 2 in. wide, smaller leaf half as big; petioles 1.5 in. long (.5 in. long, in smaller one). Peduncles .7 in. long. Spikes 1.5 in. long, green. Bracts .75 in. long, elliptic, acute, green. Flowers short, hardly projecting. Calyx .125 in. long, cleft to base, pubescent, lobes 2, lanceolate-linear, 3 linear. Corolla .25 in. long, white. Capsule .3 in. long, linear, shorter than bracts, blunt pubescent. Seed flat orbicular. *Hab.* Very rare, perhaps extinct. Singapore, abundant on the stream at Stagmount, but entirely destroyed in 1910; Chua Chu Kang; Pulau Damar (Ridley).

11. STROBILANTHES, Bl.

Herbs or undershrubs often large. Leaves often very unequal, sometimes falsely alternate, crenate or serrate. Flowers often showy in heads or strobilate, solitary, paniced or cymose or in small clusters paniced. Bracts prominent or small and caducous. Bracteoles 2 or 0. Sepals sub-equal free nearly to base. Corolla tubular campanulate, lobes round. Stamens 4; anther-cells 2. Pollen grains ribbed not spiny ellipsoid. Ovary oblong or ellipsoid; ovules 2 in a cell; style with one long branch. Capsule narrow ellipsoid, short-stalked, 4-seeded. About 200 species, Africa, Asia, Australia.

- Heads solitary, few-flowered, enclosed in 2 large leafy bracts; flowers large, white; slender shrubs.
- Leaves scarcely hairy (1) *S. Maingayi*
 Leaves pubescent; bracts broader (2) *S. bibracteatus*
 Leaves red hairy; bracts rufous hairy (3) *S. hirtisepalus*
- Heads several-flowered with many leafy bracts; a big shrub, glabrous; flowers white (4) *S. latebrosus*
- Flowers strobilate or in short heads, conspicuously red hairy.
- Slender plant, small leaves and small ovoid head (5) *S. rufo-sepalus*
- Slender plant; leaves narrow, short; heads 2- to 3-flowered; bracts spatulate (6) *S. rufo-pauper*
- Heads cylindric with leaf-like bracts, 2 in. long; robust plant (7) *S. rufo-strobilatus*
- Heads oblong or ovate, solitary.
- Leaves hairy (8) *S. ruficaulis*
 Leaves above glabrous or nearly.
- Leaves broad elliptic (9) *S. rufo-capitatus*
 Leaves broad lanceolate (10) *S. vulpinus*
 Head solitary, globose sessile (11) *S. scabridus*
- Heads 3 or 4, terminal and axillary; leaves veined white (12) *S. albostriatus*
- Flowers in racemes with conspicuous, oblong white hairy bracts (13) *S. leucopogon*
- Bracts small caducous; flowers in lax spikes or panicles.
- Panicles terminal spreading.
- Leaves membranous; flowers white (14) *S. collinus*
 Leaves sub-coriaceous, blue (15) *S. pachyphyllus*
- Inflorescence spicate.
- Spikes terminal and axillary; flowers pedicelled (16) *S. sylvestris*
 Spikes in pairs axillary; flowers sessile (17) *S. phoeniceus*
 Inflorescence of 3 peduncled heads (18) *S. pedicellatus*

(1) *S. Maingayi* Clarke in Hook. fil. F.B.I. iv. 448; Journ. As. Soc. Beng. lxxiv. 655.

Low branched shrubby plant up to 3 ft. tall, pubescent. Leaves very unequal, glabrous, broad lanceolate serrulate acute, base shortly narrowed, the larger ones 3 in. long, 1.5 in. wide, many much

smaller; petioles $\cdot 3$ in. long, pubescent. Flowers 1 to 5, capitate in an ovoid sub-sessile head in 2 ovate green bracts, $\cdot 5$ to 1 in. long, crenate. Sepals oblong-acute, $\cdot 4$ in. long. Corolla 2 in. long, 1 in. or more across; limb pure white, tube narrow then rather abruptly funnel-shaped. Capsule oblong, $\cdot 5$ in. long. Seeds 4. villous. *Hab.* Forests at 2000 ft. altitude upwards. Selangor, Bukit Hitam (Kelsall); Menuang Gasing, Ulu Langat (Kloss). Perak, Thaiping Hills. Penang, Penara Bukit and West Hill (all collectors).



FIG. 127.—*Strobilanthes Maingayi*.

(2) *S. bibracteatus* Bl. *Bijdr.* 799; *Clarke, l.c.* 656.

Much resembling *S. Maingayi*, but the stems, leaves and bracts are pubescent, the bracts broader and more ovate and crenate at the top and the flower a little shorter, 1.5 in. long. *Hab.* Mountain forests up to 5500 ft. altitude. Perak, Thaiping Hills to Gunong Hijau (Ridley, Wray, Scortechini). *Distrib.* Sumatra, Java.

(3) *S. hirtisepalus* Clarke, *l.c.* 656.

Similar to the last but roughly hairy all over. Bracts more lanceolate than the last, very hairy. *Hab.* Mountain forests, Selangor, Ginting Bidai (Kloss). Pahang, Telom (Ridley). Perak, Thaiping Hills (Kunstler). Kedah Peak.

All these three may well be placed as varieties of one species.

(4) **S. latebrosus** *Ridl. Journ. Roy. As. Soc. S. Br.* 86, p. 304.

A big spreading shrub 8 ft. tall, glabrous except the innermost bracts. Leaves chartaceous, ovate-lanceolate, cuspidate blunt, base decurrent on petiole, edge undulate; nerves 10 pairs; 9 in. long, 3 in. wide; petioles 1.5 in. long. Flower-heads solitary or three together axillary or on short lateral shoots, 1.25 in. long; peduncle .3 in. long, thick. Bracts numerous, large leaf-like, outer ones ovate, 1 in. long, .5 in. wide, inner ones lanceolate-linear blunt, narrower, hairy; all green. Corolla 2 in. long, pure white, limb over 1 in. wide, tube at base cylindric then abruptly dilated, urn-shaped, lobes short round. Stamens enclosed in tube at base of the thickened part. Capsule .75 in. long, sub-acute, not dilated at tip. Seeds 4, rounded, ellipsoid flat. *Hab.* Dense forest in ravines by streams, Negri Sembilan, Bukit Tangga (Ridley).

(5) **S. rufo-sepalus** *Clarke, l.c.* 656.

A long twiggy plant rooting at base and ascending to 18 in. tall, above red-hairy. Leaves very unequal, one twice as big as the other, elliptic, narrowed to both ends blunt crenate, sparsely hairy, 1 to 2.25 in. long, .25 to 1 in. wide; petioles .25 in. long. Heads terminal of 3 or 4 flowers. Bracts linear, .5 in. long, like the sepals with long red hairs. Sepals .35 in. long, linear subulate. Corolla 1 in. long, white, the limb violet, tube campanulate, base narrow cylindric. Capsule .35 in. long. Seeds 4. *Hab.* Local, Hill forests. Perak Ipoh (Curtis); Thaiping Hills; Sira Rimau foot of Gunong Inas (Yapp). Penang, Richmond Pool and Con-valescent Bungalow (Curtis, Ridley).

(6) **S. rufo-pauper** *Clarke, l.c.* 657.

Slender, rooting at nodes pubescent. Leaves unequal elliptic-lanceolate, crenate glabrous above, 1 to 2 in. long, .75 in. wide or smaller; petioles very short. Heads very small, few-flowered, 1 flower axillary in a leafy bract. Bracts narrow, up to 1 in. long. Bracteoles .25 in. long, linear, red-hairy. Calyx .2 in. long, sepals linear hairy. Corolla 1 in. long, violet, slightly curved. Capsule 4-seeded. *Hab.* Mountain forests, Pahang, Gunong Berumbun, Telom. Perak, Thaiping Hills about 2500 ft. altitude (all collectors).

(7) **S. rufo-strobilatus** *Clarke, l.c.* 657.

Fairly stout red-hairy plant over 1 ft. tall, base rooting. Leaves nearly equal ovate acuminate, blunt, base cuneate, crenulate, 4 in. long, 2 in. wide, sparsely hairy above; petioles .5 in. long, hairy. Heads cylindric, 2 in. long, with leaf-like bracts. Bracteoles .5 in. long, linear-spathulate, dense red-hairy. Sepals .4 in. long, linear. Corolla 1.25 in. wide, tube curved campanulate, lobes purple. *Hab.* Perak (Scortechini). Rare.

(8) **S. ruficaulis** *Ridl. Journ. F.M.S. Mus.* iv. 53.

Stem ascending, 8 to 12 in. tall, simple or branched, rough red-hairy. Leaves subequal elliptic-lanceolate acuminate, base cuneate, undulate crenate, hairy with scattered yellow hairs, 4 in.

long, 1.5 in. wide. Heads 1 in. long, few-flowered. Bracts 6 to 8, lanceolate obtuse, .5 in. long, .1 in. wide. Corolla campanulate, tube narrow at base, sparsely hairy, light blue, .5 in. long, and as wide at mouth. *Hab.* Pahang, Gunong Berumbun, Telom. Rare (Ridley).

(9) ***S. rufo-capitatus*** *Clarke, l.c.* 657.

Shrubby creeper 6 to 8 ft. long; branches red-hairy. Leaves sub-equal or very unequal, broad elliptic acuminate, base cuneate, undulate obscurely crenate, as much as 8 in. long and 3.5 in. wide or less, glabrous above; nerves beneath pubescent; petioles .15 to .3 in. long. Heads sessile or peduncled up to 2 in. long, densely red-hairy, 1 to 2 in. long. Bracts leaf-like, lanceolate, .75 in. long, .125 in. wide. Bracteoles .25 in. long. Sepals linear, .25 in. long, all red-hairy. Corolla white. *Hab.* Rocks at 2500 to 3000 ft. altitude. Rare. Perak (Kunstler).

(10) ***S. vulpinus*** *Ridl. Journ. F.M.S. Mus.* iv. 53.

Stem 1 ft. tall, branched or not, slender, densely covered with curly brown hairs. Leaves equal, broadly lanceolate, rhomboid acuminate at tip, narrowed at base, glabrescent, edges undulate crenate, 5 in. long, 2 in. wide; petioles .25 in. long, shortly rough hairy. Heads 1 or 2, terminal, 2 to 3 in. long, on 1 in. long peduncles. Bracts linear or oblong-linear, blunt, rufous-hairy. Sepals linear blunt, .2 in. long, red-hairy. Corolla .75 in. long, curved, dilate suddenly at top, pubescent, light blue. Capsule base narrow. Seeds 4. *Hab.* Mountain forests at 3000 to 4000 ft. altitude. Pahang, Telom, and down the valley Ulu Batang Padang (Ridley).

(11) ***S. scabridus*** *Ridl. Journ. F.M.S. Mus.* iv. 54.

Robust herb; stems brown-hairy. Leaves very unequal, lanceolate coriaceous-chartaceous, acuminate narrowed to winged petiole, crenulate; nerves prominent above, 6 pairs; glabrous above, beneath paler, midrib hairy; large leaves, 6 in. long, 2 in. wide, smaller half as big. Head terminal, globose, sessile, 1 in. long. Bracts ovate to orbicular-elliptic, tip round. Corolla over 1.5 in. long; limb 1 in. across, white. *Hab.* Mountains in thick forest. Pahang, Gunong Berumbun, Telom. Selangor, Semangkok Pass (Ridley).

(12) ***S. albostriatus*** *Ridl. Journ. F.M.S. Mus.* iv. 54.

Herb branched, 1 ft. tall, with short brownish hair soon glabrescent below. Leaves sub-equal or unequal ovate acuminate; base cuneate, crenulate, above glabrous, dark green, veins white; dark purple red beneath; nerves scurfy pubescent, 3 in. long, 1.5 in. wide; petioles 1 in. long, scurfy-hairy. Heads 3 to 4, terminal and often in upper axils; peduncles .25 to nearly .5 in. long, hairy. Sepals linear acuminate, hairy. Corolla blue, 1 in. long, suddenly dilate upwards, curved, .25 in. across limb. *Hab.* Mountain forests. Pahang, Telom, abundant in woods. Perak, Temengoh (Ridley).

(13) **S. leucopogon** Ridl. *Journ. Roy. As. Soc. S. Br.* 86, p. 304.

Shrubby, glabrous; branches angled. Leaves chartaceous lanceolate acuminate, narrowed to a sub-truncate base, edge slightly undulate; nerves 7 pairs, elevate, transverse nervules few, sub-horizontal; 6 in. long, 2 in. wide; petioles under .1 in. long. Racemes in terminal axils on branches, .5 in. long, with a pair of much reduced ovate leaves at base, 1.5 in. long, cylindric. Bracts ovate-oblong, blunt, .15 in. long, .08 in. wide, covered with long white spreading hairs. Sepals shorter than corolla-tube, very narrow linear-spathulate, white-hairy. Corolla .75 in. long, pure blue; tube at base slender cylindric then dilate, funnel-shaped, glabrous; lobes small, round, sub-equal, mouth .4 in. across. *Hab.* Lankawi, Dayong Bunting, flowers pure blue (Robinson).

(14) **S. collinus** Nees, *Wall. Pl. As. Rar.* iii. 86; *Clarke, l.c.* 658.

A big herb or shrub 4 ft. tall. Leaves equal elliptic acuminate; base cuneate, serrate, glabrous, 10 in. long, 3 in. wide; petioles 1 in. long. Panicles terminal, spreading pubescent 8 to 9 in. long and 5 in. across. Flowers sessile in distant pairs. Sepals linear, pink, .25 in. long, pubescent. Corolla 1.5 in. long, tubular campanulate, white tinged pink. Capsule .7 in. long, linear-pubescent. Seeds 4. *Hab.* Mountain forests about 2000 to 5000 ft. altitude, sometimes lower. Perak, Thaiping Hills (Kunstler); Sungei Pae (Curtis). Penang (Wallich). Lankawi, Gunong Raya (Curtis). Kelantan, Chaning Woods (Ridley).

(15) **S. pachyphyllus** Clarke, *l.c.* 658.

Shrub 4 ft. tall. Leaves equal elliptic-obovate, acute, base cuneate entire or very obscurely crenate, sub-coriaceous, silvery grey pubescent beneath; nerves and transverse nervules very prominent beneath, midrib very thick; 5.5 in. long, 2 in. wide; petioles 1.5 in. long. Panicle 6 in. long, 1 in. wide, terminal long peduncled, branches hardly .25 in. long. Sepals .25 in. long, linear, glabrous. Corolla 1.25 in. long, narrow tubular-campanulate light blue. *Hab.* Top of limestone mountains, Perak, Gunong Meusah, Kinta (Kunstler). Rare.

(16) **S. sylvestris** Ridl. *Journ. Roy. As. Soc. S. Br.* 57, p. 80.

Herb 2 ft. tall, pubescent. Leaves in sub-equal pairs, 2 to 3 in. apart, lanceolate acuminate both ends, decurrent below, glabrous, 4 to 6 in. long, 2 in. wide; petioles winged to base, .5 to 1 in. long. Spikes terminal and axillary. Bracts lanceolate acuminate, .75 in. long, .1 in. wide, green pubescent caducous. Spikes elongating to over 3 in. Flowers in opposite pairs very shortly pedicelled. Sepals linear-lanceolate pubescent, .25 in. long. Corolla 2 in. long, white, hairy within. *Hab.* Perak, Temengoh Woods; rare (Ridley).

(17) **S. phœniceus** Ridl. *S. violacea* Ridl. *Journ. Roy. As. Soc. S. Br.* 57, p. 80 (*not of Beddome*).

Large spreading herb, 2 ft. or more tall; branches flexuous,

internodes 2 in. long, 2-winged. Leaves alternate glabrous, lanceolate acuminate, edges undulate or at base serrate, 4 to 6 in. long, 1.5 in. wide. Spikes in axillary pairs, 3 to 4 in. long, lax. Bracts lanceolate blunt pubescent, .25 in. long, caducous. Flowers sessile. Sepals linear obtuse, .25 in. long. Corolla 1 in. long, violet; limb 1.5 in. across. *Hab.* Woods; rare. Perak, river banks, Ulu Temengoh (Ridley).

(18) *S. pedicellatus* Ridl. *Journ. F.M.S. Mus.* iv. 54.

Leaves ovate acuminate, base cuneate, serrate glabrous, very unequal; nerves inconspicuous, 6 to 7 pairs; large leaf, 5 in. long, 2 in. wide, small, 1.5 in. long; petioles 1 in. long. Inflorescence of 3 heads on 2.5 in. long slender peduncles, a pair of leafy bracts at base. Flowers several, bracts oblong obtuse pubescent, .5 in. long, shortly, stoutly pedicelled. Sepals linear blunt pubescent, .5 in. long. Corolla 1.5 in. long, white hairy inside. *Hab.* Pahang, Cameron's Plateau, track to Gunong Irau (Robinson and Kloss). Very rare.

EXCLUDED SPECIES

- S. ELONGATA* Kunze, *l.c.* 497; *Clarke, l.c.* 639, based on *Erythacanthus elongatus* Nees, a Javanese plant. T. Anderson gives it in his list of *Acanthaceæ* as Penang (Wallich), but no specimen occurs in Wallich's collection.
- S. DYERIANUS* Masters, *Gard. Chron.* xiii, 442 (1893); "Penang, Curtis" *Clarke, l.c.* 657. This was obtained in Burma by Boxall and merely cultivated in Penang and Singapore.

12. ACANTHOPALE, Clarke

Herbs with the habit of *Strobilanthes*, but the pollen is spiny without ribs. About 20 species, African and Indian.

(1) *A. malasica* Clarke, *l.c.* 659.

Herb, sparsely hairy at tip. Leaves equal elliptic-triangular nearly entire, sparsely pubescent, sub-acute, base deltoid, 2.5 in. long, 1 to 1.5 in. wide; petioles .25 in. long. Flowers sessile in short-peduncled axillary spikes. Bract linear-ligulate, .5 in. long. Bracteoles .25 in. long, linear glabrous. Sepals equal, .25 in. long, linear, tips hairy. Corolla .75 in. long, nearly glabrous. Stamens 4, glabrous; anther-cells parallel muticous level, pollen globose spiny. Ovary glabrous; style thinly hairy, one branch long, the other suppressed. Capsule .7 in. long, base barren, long. Seeds 4, crowded in the globose head, shaggy. *Hab.* Rare and very little known, Lankawi (Ridley).

The genus *Acanthopale* Clarke, differs from *Strobilanthes* only in the pollen being spiny without ribs, instead of ellipsoid smooth and ribbed. Clarke only saw one grain of pollen on this plant, and that is doubtful.

13. ACANTHUS, Linn.

Shrubby herbs. Leaves stiff, usually spiny. Flowers in a terminal spike. Bracts ovate. Bracteoles 2 or 0, similar. Sepals free nearly to base; 2 inner narrower than outer. Corolla 2-lipped, upper lip truncate or 0, lower lip large deflexed, wide flat, 3-lobed. Stamens 4, filaments thick; anthers oblong with stiff white hairs. Capsule ellipsoid woody, bright brown, 2-seeded. Seeds discoid, glabrous. Species about 10, South Europe to Polynesia.

Stiff erect tidal swamp plants; leaves spiny.

Corolla large, blue; bracteole .25 in. long . . . (1) *A. ilicifolius*

Corolla smaller, white (or pale blue); bracteoles 0. . . (2) *A. ebracteatus*

Unarmed climber; leaves some or all entire . . . (3) *A. volubilis*

(1) *A. ilicifolius* Linn. *Sp. Pl.* 639; *Clarke, l.c.* 659.

Stems about 2 ft. tall. Leaves dark green, prickly, oblong lobed, 4 to 7 in. long, 1 to 3 in. wide; petioles .1 in. long. Spikes 6 in. long, with several flowers. Bracts .3 in. long, ovate. Bracteoles .25 in. long. Sepals, 2 outer round ovate, .5 to .7 in. long. Corolla large showy, blue, 1.75 in. long. Capsule oblong, 1 in. long, .5 in. across. *Hab.* Scarce, except in the north, tidal river mud, Perak, Matang (Wray). Lankawi, Kwah. Setul. Perlis. Pulau Adang, Rawei Isle (Ridley). Commoner in India to Australia.

(2) *A. ebracteatus* Wall. *Enum.* ii. 75, t. 40; *Clarke, l.c.* 660.

Two or more ft. tall, much more slender than *A. ilicifolius*. Leaves smaller, narrower, 5 to 7 in. long by 2 in. wide, deeply lobed and spiny, dark green; petioles .1 in. long or less. Spike 4 in. long, many-flowered. Bracts ovate, .25 in. long. Bracteoles 0. Calyx-lobes as long, ovate. Corolla usually white, but sometimes pale blue, lip 1 in. long, .75 in. across, white entirely or with cobalt blue tip and yellowish central keel, elliptic-oblong. Stamens pink. Capsule oblong. *Hab.* Very common in all tidal rivers from Singapore to Setul. Singapore, Jurong; Gelang, both blue and white forms. Johor, Tana Merah Road. Pahang, Pekan. Malacca, Sungei Hudang (Cantley); Malacca town. Penang (Curtis); Setul near Bukit Rajah Wang. *Distrib.* Indo-Malaya. *Native name:* Jerujuh. *Use:* The seeds in decoction have a high reputation for persistent boils. Pounded and mixed in water they are said to cure and preserve from future attacks for one year for each seed taken.

This has often been confused with *A. ilicifolius*, though no one who saw the two plants alive could possibly mistake them. The fine large azure blue flowers of *A. ilicifolius*, more than twice as big as those of the white-flowered, more rarely bluish, *A. ebracteatus*, distinguish the two at the first glance.

(3) *A. volubilis* Wall. *Pl. As. Rar.* ii. 56, t. 172; *Clarke, l.c.* 660.

Twining plant. Leaves lanceolate acuminate mucronulate, narrowed to the base, entire unarmed, 6 in. long, 1 to 1.15 in.

wide; petioles .5 in. long. Spike 5 in. long, narrow. Bracts broad, ovate, .25 in. long. Calyx-lobes as long. Corolla white, 1 in. long. *Hab.* Not common. In tidal mud among grasses, Singapore, Kranji; Tampinis. Johor, near town (Ridley). Penang (Curtis). *Distrib.* Indo-Malaya, Australia.

14. PHLOGACANTHUS, Nees

Undershrubs with rather thin large leaves. Flowers in a terminal spike usually large and showy. Corolla-tube long, curved or short with sub-regular lobes. Stamens 2; anther-cells oblong parallel. Capsule narrowly ellipsoid contracted to the base. Seeds about 8. Species 12, Indian, Siamese. Clarke suggests that the 2 genera *Gymnostachyum* and *Phlogacanthus* might be united, but the typical Indian *Phlogacanthi* seem totally distinct from the first section here of *Gymnostachyum* sp. 1 to 5 and from our only species of *Phlogacanthus*, which seems more closely allied to *Gymnostachyum* sp. 6 to 13, only differing in the form of the capsule.

(1) *P. brevis* Clarke, l.c. 665.

Shrubby, ascending 12 to 18 in. tall. Leaf ovate blunt narrowed and decurrent on petiole, 4.5 in. long, 3 in. wide; petioles 1 to 1.5 in. long. Panicle 2 to 4 in. long, dense with short branches. Sepals .15 to .2 in. long, pubescent. Corolla thick, tube short, .25 in. long and as wide, pubescent. Capsule 1 in. long, nearly .2 in. wide, sub-cylindric blunt narrowed at base, 8-seeded. *Hab.* Perak, Larut (Kunstler). Rare.

Except for the capsule being narrowed at the base, this is extremely close to *Gymnostachyum magnum* and *G. insulare*, closely resembling them in habit and corolla.

15. GYMNSTACHYUM, Nees

Herbs or somewhat shrubby. Leaves lanceolate to obovate, slightly crenulate or entire. Panicle terminal of elongate or short branches rarely axillary or spicate, branches simple; cymes small lateral or flowers single. Bracts linear, very small. Calyx small, deeply divided into 5 narrow segments pubescent. Corolla .5 to 1 in. long or less; tube narrow or thick; limb 2-lipped. Stamens 2; anther-cells 2, parallel. Ovary conic; style shortly bifid. Capsule .5 to 1 in. long, terete sides parallel, 8- to 20-seeded from base. Seed ovoid flattened. The fruit is only known in the first 5 and in *G. insulare*, the others may be *Phlogacanthi*. Species 25 to 30, Indo-Malaya to Australasia.

Dwarf plants with flowers solitary of long slender spikes; corolla-tube long, blue, base white.

Leaves narrowed at base abruptly on a broad-winged petiole

(1) *G. decurrens*

Leaves on long partly winged petioles in distant pairs; flowers 1 in. long

(2) *G. diversifolium*

- Leaves on partly winged petioles; flowers
 4 in. long (3) *G. Robinsonii*
 Flowers white (4) *G. pallens*
 Flowers, tube pink, limb yellow (5) *G. ceylanicum*
 Stem elongate often shrubby; corolla-tube long,
 slender.
 Spike short, slender, sometimes axillary; style
 hairy (6) *G. simplicicaule*
 Spike dense; style glabrous.
 Leaves with 5 or 6 pairs of nerves (7) *G. hirtistylum*
 Leaves with 9 to 11 pairs of nerves elevate
 beneath (8) *G. magis-nervatum*
 Panicles 8 in. or more long.
 Leaves elliptic acuminate; panicle long-
 branched (9) *G. Scortechinii*
 Leaves elliptic acuminate; panicle linear of
 short cymes (10) *G. Ridleyi*
 Flowers very small, white, tube short (11) *G. knoxiifolium*
 Corolla-tube short broad thick, lobes as
 long (12) *G. magnum*
 Leaves broad, 6 in. across, lanceolate (13) *G. insulare*

(1) *G. decurrens* Stapf, *Kew Bulletin*, 1894, p. 357.

Stem 1 to 4 in. tall. Leaves membranous ovate blunt, undulate decurrent on the broad winged petioles, crowded at base, dark green with grey blotches, biggest 5 by 3 in., but most are smaller. Spikes several on one stem pubescent, linear narrow, 4 to 7 in. long. Flowers solitary sub-sessile, numerous. Sepals purple. Corolla white glandular-pubescent, .5 to .6 in. long, tip of lower lip violet and violet streaks on the white bases of the palate. Capsule .7 in. long, linear. *Hab.* Mountain woods, local, Pahang, Kwala Tembeling (Ridley). Lankawi (Curtis).

(2) *G. diversifolium* Clarke, *l.c.* 662.

Stem creeping ascending, closely pubescent, up to 6 in. tall with distant pairs of leaves ovate with a broad base but decurrent on petiole for some way, pubescent on both sides, obscurely crenulate, 3 in. long, 2.5 in. wide; petioles 1 to 2 in. long. Spikes 1 to 3, terminal pubescent, slender, .3 to .5 in. long. Flowers solitary, sessile. Sepals .1 in. long, pubescent. Corolla 1 in. long, pale blue. Fruit .5 in. long. *Hab.* In forests. Perak, Ulu Temengoh; Sungei Rayah (Kunstler). Kelantan, Kwala Aring (Yapp). Lankawi (Curtis).

(3) *G. Robinsonii* Ridl. *Journ. Roy. As. Soc. S. Br.* 86, p. 305.

Stem shortly creeping ascending woody, 3 in. long. Leaves elliptic-ovate to round blunt, base decurrent on petiole, scabrid above and beneath; midrib on both sides and 5 pairs of nerves, scurfy pubescent; 1.25 to 2.25 in. long, 1.1 to 1.75 in. wide; petioles flattened, .5 to 1.25 in. long. Raceme 3 in. long, sometimes branched pubescent, slender. Flowers solitary about 10. Bract narrow-linear pubescent, .1 in. long. Calyx shorter, sepals linear acuminate pubescent, base broader. Corolla .4 in. long, puberulous, tube

cylindric, upper lip ovate, lower lip very short, blunt. Stamens 2, longer than upper lobe. Ovary cylindric pubescent; style long glabrous. *Hab.* Lankawi islands, Dayong Bunting (Robinson).

This resembles *G. diversifolium*, but the flowers are only half as big.

(4) ***G. pallens*** *Clarke, l.c.* 662.

Rhizome long, woody. Stem .5 to 1 in. tall. Leaves broad ovate, tip sub-obtuse, nearly glabrous, shortly decurrent on petiole, wavy crenate above, densely punctate, lower surface pale green, 4 in. long, 2.5 in. wide. Spike 3 to 4 in. long on a peduncle as long slightly branched minutely pubescent; flowers solitary. Calyx .125 in. long. Corolla .5 in. long, white. Capsule more than .5 in. long. *Hab.* Perak (Kunstler).

Very rare. I have not seen it.

(5) ***G. ceylanicum*** *Arn. and Nees, Hook. Comp. Bot. Mag.* ii. 311.

Stem short; leaves crowded at base, oblong undulate blunt narrowed to base, 3 in. long, 1 in. wide; petioles 1 to 1.5 in. long, winged narrowly above. Spikes several erect, 6 to 8 in. long, pubescent. Flowers solitary opposite or in long spikes in short cymes. Calyx .25 in. long, lobes linear hairy. Corolla-tube slender, .5 in. long, pink, lobes short, yellow, almost straight. Capsule .5 in. long. *Hab.* Lankawi (Curtis). *Distrib.* Ceylon.

Curtis's plant seemed absolutely indistinguishable from living plants from Ceylon.

(6) ***G. simplicicaule*** *Clarke, l.c.* 663.

Stem unbranched, rooting at base, erect part 7 in. tall, slightly pubescent. Leaves elliptic short, blunt, narrowed at tip, base narrowed blunt, entire, glabrous except the inconspicuous nerves and midrib on back, 3 in. long, 1 in. wide; petioles .25 to .5 in. long. Panicle or spike terminal, 1 in. long; peduncle as long or shorter. Flowers few. Bracts ovate. Sepals .125 in. long, linear. Corolla .5 in. long, grey and yellow or purple, 2-lipped, glabrous. *Hab.* Perak, Sungei Rayah (Kunstler). Rare.

(7) ***G. hirtistylum*** *Clarke, l.c.* 663.

Glabrate; stem 1 ft. tall, rooting at base. Leaves equal elliptic acute, base broad cuneate; nerves 6 to 7 pairs; 4 in. long, 2 in. wide; petioles 2 in. long. Inflorescence pubescent of 2 terminal, simple linear interrupted spikes ebracteate; peduncle 2.5 to 1 in. long. Flowers in clusters of 1 to 2, opposite, lower pairs distant. Sepals hardly .125 in. long, linear. Corolla white, very small, tube short; style hairy. *Hab.* Perak (Kunstler).

Very rare. I have not seen it.

(8) ***G. magis-nervatum*** *Clarke, l.c.* 663.

Herb 1 to 2 ft. tall, glabrous, rooting at base decumbent,

branched. Leaves equal, elliptic-lanceolate acuminate at each end, blunt or sub-acute; nerves 9 to 11 pairs, conspicuous and meeting in an intra-marginal vein; 3 to 4 in. long, 1 to 1.5 in. wide, glossy dark green above with silvery grey streaks and ribs. Panicles terminal (axillary in the only specimen in Kew), .5 in. long; spikes simple of (4) 12 to 20 flowers. Bracts minute. Sepals .1 in. long, lanceolate. Corolla .5 in. long, cream-colour, 2-lipped nearly half-way. Pistil glabrous. *Hab.* Low wet ground. Perak, Larut (Kunstler). Rare.

(9) **G. Scortechinii** Clarke, l.c. 664.

Stem 12 to 18 in. tall. Leaves elliptic acuminate both ends, minutely pubescent beneath, entire, 7.5 in. long, 2.5 in. wide; petioles .5 to 1.5 in. long. Panicle (very young) 8 in. long; branches long, many-flowered, rusty pubescent. Flowers mostly in approximate opposite pairs. Calyx .125 in. long. *Hab.* Perak (Scortechini).

I have not seen this species, and Clarke is doubtful as to its genus.

(10) **G. Ridleyi** Clarke, l.c. 664.

A tall shrub. Leaves elliptic shortly cuneate-acuminate at both ends, pubescent beneath, 6 to 7 in. long, 2.25 in. wide; petioles .75 in. long, pubescent. Panicle reduced almost to spikes, 2 terminal, 11 in. long, .75 in. wide. Bracts .125 to .2 in. long, linear. Flowers distant, solitary or in 2- to 4-flowered lateral cymes on peduncles hardly .15 in. long. Sepals .15 to .2 in. long, pubescent. Corolla white. *Hab.* Local in woods. Selangor, Rawang. Perak, Bujong Malacca (Ridley).

(11) **G. knoxiifolium** Clarke, l.c. 664.

About 3 ft. tall, nearly glabrous except inflorescence minutely pubescent. Stem erect. Leaves in distant pairs lanceolate long-acuminate narrowed to base, thick; nerves 7 pairs; 6.5 in. long, 2 in. wide; petioles .25 in. long. Panicle of 2 branches 8 in. long, linear with small opposite distant cymes. Bracts .2 in. long, linear. Sepals .075 in. long, oblong-linear. Corolla white, small, .15 in. long. *Hab.* Edges of woods, lowlands. Scarce. Johor, Sungei Tebrau. Negri Sembilan, Perhentian Tinggi. Perak, Batu Gajah (Ridley).

(12) **G. magnum** Clarke, l.c. 664.

Shrub, glabrous, upper internodes 7 in. long. Leaves obovate nearly glabrous entire; nerves 12 or more pairs; 12 in. long, 6 in. wide; petioles 3 in. long. Panicles terminal, 8 in. long, .75 in. through. Bracts .15 to .2 in. long. Peduncle 1.5 in. long; cymes small, 2- to 3-flowered in opposite approximate pairs. Sepals linear, .2 in. long, pubescent. Corolla green, mouth brown purple. *Hab.* Woods, not common. Negri Sembilan, Bukit Sulu (Cantley); Bukit Tampin (Goodenough). Dindings, Telok Sera. *Native name:* Supang Paya. Possibly a *Phlogacanthus*.

(13) **G. insulare** *Ridl. Journ. Roy. As. Soc. S. Br.* 61, p. 57.

Herb about 2 ft. tall, glabrous, internodes 3 in. long. Leaves lanceolate acuminate, 7-nerved, 7 in. long, 2.5 in. wide; petioles slender, 1 in. long. Panicle lax terminal; branches short to 2 in. long. Bracts linear acuminate, .05 in. long. Pedicels .1 in. long. Sepals lanceolate acuminate, as long as tube. Corolla-tube short thick, little longer than lobes, .12 in. long; limb .25 in. across, pubescent, white. Capsule terete, 1 in. long on a thickened, lengthened pedicel. Seeds 8. *Hab.* Adang group, Rawei island in woods (Ridley).

16. ANDROGRAPHIS, Wall.

Herbs. Leaves entire. Racemes or spikes 1-sided axillary and terminal often forming panicles. Bracts very small. Flowers solitary or in few-flowered clusters, distant. Sepals small linear. Corolla 2-lipped, base tubular, white, spotted pink on palate. Stamens 2, hairy; anther-cells ovate, base acute. Capsule narrow-oblong, sides parallel with seed from base. Seed 6 to 12, cuboid pitted. Species 18, India, China, and Malaya.

Leaves lanceolate; flowers lax-panicked (1) **A. paniculata**
 Leaves ovate; flowers sub-racemose (2) **A. tenuiflora**

(1) **A. paniculata** *Nees, Wall. Pl. As. Rar.* iii. 116; *Clarke, l.c.* 665.

Annual, 1 to 3 ft. tall. Leaves lanceolate, glabrous, acuminate, 2.5 in. long, .5 to .75 in. wide; petioles .25 in. long. Racemes spreading numerous forming a panicle 4 to 12 in. long and sometimes 9 in. across, very lax. Calyx .05 in. long. Corolla .4 in. long. Capsule .5 to .75 in. long, sub-acute both ends. *Hab.* Open sandy places, Penang, Jelutong (Curtis). Setul, abundant in waste ground (Ridley). *Distrib.* India.

(2) **A. tenuiflora** *T. Anders. Journ. Linn. Soc.* ix. 502.

Branched herb, 2 ft. tall. Leaves ovate acute, base decurrent shortly on the petiole, 2 to 2.5 in. long, 1.5 in. wide; petioles .4 in. long. Racemes sometimes branched, very slender axillary and terminal. Flowers distant. Sepals very narrow, setaceous. Corolla .4 in. long. *Hab.* Lankawi, Terutan and other isles (Curtis, ¹⁶¹ Ridley). *Distrib.* Indo-Malaya.

17. PHIALACANTHUS, Benth.

Shrubs with opposite equal leaves. Racemes terminal, few-flowered, glabrous. Flowers rather large, nodding. Sepals united in a tube at base. Corolla with a short tube and dilate at the top. Stamens 4. Capsule supported by the elongate hardened tube, stalked. Seeds 4. Species 4 or 5, 1 Assam, the others Malay Peninsula,

- Calyx-tube as long as lobes (1) **P. Wrayi**
 Calyx-tube shorter than lobes.
 Corolla 1.25 in. long (2) **P. major**
 Corolla .6 in. long (3) **P. minor**

(1) **P. Wrayi** *Clarke, l.c.* 668.

Shrub, branched 2 to 3 ft. tall. Leaves elliptic acuminate, base acute, 5 in. long, 2 in. wide; petioles .75 to 1 in. long. Racemes terminal, one or two on a terminal panicle, 2 to 4 in. long. Bracts hardly .1 in. long. Calyx in flower .25 to .35 in. long; teeth triangular, acute in fruit, lengthening to .5 in. long. Corolla 1 in. long, pale primrose. Capsule more than 1 in. long, oblong-ellipsoid, smooth, retinacula large. *Hab.* Mountains at 6700 ft. altitude. Rare. Perak, Gunong Batu Putih (Wray).

(2) **P. major** *Clarke, l.c.* 669.

Shrub 6 to 8 ft. tall. Leaves equal, elliptic-lanceolate, acuminate, base shortly narrowed, 8 in. long, 3 in. wide or less; petioles 1.25 in. long. Panicles 2 to 5 in. long, terminal or reduced to simple racemes. Flowers opposite in rather distant pairs; pedicels very short. Calyx .35 in. long, divided into narrow lanceolate teeth half-way. Corolla 1.25 in. long, waxy yellowish white. *Hab.* Perak, Gunong Batu Putih (Kunstler). Rare.

(3) **P. minor** *Clarke, l.c.* 669.

Shrubby glabrous. Leaves membranous lanceolate or elliptic-lanceolate, long-acuminate, base cuneate, often slightly inæquilateral, edge obscurely undulate; nerves curved, about 8 pairs; 6 in. long, 1.75 in. wide; petioles .5 in. long. Racemes terminal and in upper axils 2 in. long. Flowers about 15, in pairs. Bracts very short linear acuminate. Pedicels .2 in. long. Sepals 5, narrow lanceolate free nearly to base, .15 in. long. Corolla .75 in. long, tube trumpet-shaped; lips unequal, lobes short blunt, lower lip hairy on disc. Stamens 4 with short points below; anther-cells parallel. Ovary glabrous; ovules 4. *Hab.* Mountains. Perak (Scortechini); Gunong Inas (Yapp) at 3700 ft. altitude.

The species was described from very poor material collected by Scortechini, and the description by Clarke is consequently somewhat inadequate. Unlike the other species, the calyx has hardly any tube, the sepals are free nearly to the base.

18. FILETIA, Miq.

Shrubs or nearly entirely herbaceous. Leaves somewhat fleshy, equal. Panicle of few branches usually reduced to a raceme; pedicels very short; bracts usually small. Sepals free nearly to base, narrow. Corolla-tube cylindric, thick, upper lip sub-entire, lower lip 3-lobed, all white, lower lip yellow, mouth inside hairy. Stamens 4, sub-similar; anther-cells muticous, one half-way below the other. Style shortly bifid. Capsule stalked, clubbed with 4 warty seeds. Species about 10, Malay Peninsula and islands.

Panicked with two spreading branches.

- Sepals glabrous; leaves 6 in. long . . . (1) **F. glabra**
 Sepals pubescent; leaves 4 in. long . . . (2) **F. paniculata**

Racemose; sepals glabrous.

- Bracts ovate white. Shrubby bush . . . (3) **F. bracteosa**
 Bracts inconspicuous, plant glabrous.
 Low-branched shrub; leaves ovate . . . (4) **F. Scortechinii**
 Low-branched shrub; leaves lanceolate . . . (5) **F. Ridleyi**
 Whole plant hairy with purple hairs . . . (6) **F. hirta**

(1) **F. glabra** *Ridl. Journ. F.M.S. Mus.* v. 42. .

A large glabrous plant. Leaves broad, lanceolate acuminate, acute, base cuneate often blunt, 6 in. long, 2·5 to 3 in. long; petioles ·25 in. long. Inflorescence a simple raceme or 3 on a peduncle 6 in. long, including peduncle. Flowers eventually distant. Bracts narrow, linear-lanceolate. Sepals lanceolate acuminate pubescent. Corolla pubescent outside, ·5 in. long, lower lip very hairy. Capsule ·5 in. long. *Hab.* Mountain forests. Rare. Selangor, Gunong Mengkuang Lebah (Robinson).

(2) **F. paniculata** *Clarke, l.c.* 670.

Shrub over 1 ft. tall. Leaves elliptic caudate-acuminate, base short cuneate, nearly glabrous, 4·5 in. long, 2 in. wide; petioles ·25 to ·35 in. long. Racemes simple or 3 on a peduncle, 2 in. long with two linear bracts at base of branches, floriferous portion about 4 in. long. Flowers pedicelled in opposite pairs; pedicels ·125 in. long. Sepals linear pubescent acuminate. Corolla ·7 in. long, yellowish, densely hairy in the throat. *Hab.* Perak (*Scortechinii*). Rare.

(3) **F. bracteosa** *Clarke, l.c.* 670; *Ridl. Journ. F.M.S. Mus.* iv. 55.

A large bushy shrub about 4 ft. tall. Leaves rather fleshy elliptic acuminate, base cuneate, 5·5 in. long, 2·25 in. wide; petioles ·3 in. long. Spikes terminal, dense, 2 in. long. Bracts ovate, white. Sepals a little longer, ·25 in. long, white, free to base. Corolla 1 in. long; tube short as calyx; upper lobes ovate blunt, white, lower lip oblong, side-lobes linear-oblong, central broad light yellow tipped white. Capsule club-shaped acute, 1·25 in. long. Seed flat inæquilateral. *Hab.* In mountain forests in open spots. Pahang, Telom at 4000 ft. altitude, abundant (*Ridley*). Perak (*Scortechinii*).

(4) **F. Scortechinii** *Clarke, l.c.* 671.

Spreading shrub with slender branches base creeping. Leaves elliptic to nearly ovate abruptly acuminate, base cuneate, glabrous entirely; nerves 5 to 6 pairs conspicuous; 2 to 4 in. long, 1·5 to 1·75 in. wide; petioles ·25 to ·5 in. long. Spike eventually rather lax of about 10 flowers, 3 to 4 in. long. Flowers sub-sessile, glabrous. Bracts oblong. Sepals linear-oblong acuminate glabrous. Corolla ·7 in. long, white; throat hairy, palate yellow. Capsule ·6 in. long, clubbed beaked. Seed obovate, flat. *Hab.* Mountain

forests at 4000 ft. altitude. Selangor, Gunong Semangkok. Perak (Scortechini).

Clarke's var. *evolutior* is a rather more drawn-out branch of the same plant.

(5) **F. Ridleyi** Clarke, l.c. 671.

Slender-branched or simple herb. Leaves rather fleshy sub-acute or acuminate, elliptic-lanceolate, upper ones quite narrow, 2 to 2.5 in. long, 1 to 5 in. wide; petioles slender, .25 in. long. Spike 2 to 3 in. long, about 10-flowered. Bract oblong, short. Sepals linear-ligulate fleshy blunt, glabrous. Corolla .7 to .8 in. long, white, throat hairy. Capsule clubbed, 1 in. long, top broad. Seeds 4. *Hab.* Mountain forests, at 4000 ft. altitude. Open spots. Pahang, Telom Ridge, Gunong Berumbun (Ridley). Perak, Bujong Malacca. Selangor, Bukit Hitam (Kelsall); Semangkok Pass (Napier).

(6) **F. hirta** Ridl. Journ. Roy. As. Soc. S. Br. 61, p. 35.

Ascending herb, base slightly woody, purple-hairy, about 1 ft. tall. Leaves ovate obtuse, narrowed towards base, hairy all over, 2.5 in. long, 1 in. wide. Raceme 3 in. long, lower half nude, hairy. Bracts linear hairy, .25 in. long. Sepals linear acuminate hairy. Corolla .5 in. long, tube stout, pubescent all over outside, white lower lip nearly glabrous, yellow. *Hab.* Open banks on mountains. Rare. Selangor, Sempang Mines in Semangkok Pass at 4000 ft. altitude (Ridley).

19. ASYSTASIA, Bl.

Herbs. Leaves equal or nearly so. Racemes terminal unilateral lax (rarely branched); pedicels short. Bracts and bracteoles very small. Calyx small, lobes linear or narrow-oblong. Corolla-tube cylindric inflate upwards. Stamens 4, didynamous; anther-cells oblong, parallel. Ovary hairy. Style long; stigmas 2, equal. Capsule oblong, 4-seeded above, base sterile solid. Seeds compressed round. Species 30, Africa and Asia.

Corolla-tube narrow cylindric, dilate only near limb

Corolla-tube narrow shortly, then large ventricose

(1) **A. intrusa**

(2) **A. coromandeliana**

(1) **A. intrusa** Bl. Bijdr. 796; Clarke, l.c. 668.

Scrambling herb 2 to 5 ft. tall, slightly pubescent. Leaves elliptic-lanceolate acuminate, base cuneate, 2 to 3 in. long, 1 in. wide; petioles slender, 1.5 in. long. Racemes 1 to 2 in. long. Sepals lanceolate, .15 in. long. Corolla violet-blue, .75 in. long, tube very narrow cylindric, dilate a little at the top, limb .3 in. across. Capsule .6 in. long, solid base about one half. *Hab.* Common in hedges and on banks in lowland open country, Singapore, Tanglin; Fort Canning. Penang, Waterfall, Balik Pulau; Pulau Tikus. *Distrib.* Malay islands.

(2) **A. coromandeliana** *Nees, Wall. Pl. As. Rar.* iii. 667.

Branching herb 1 to 4 ft. tall. Leaves ovate acute, 1 to 3.5 in. long; petioles 1 in. long or more. Racemes 4 in. long; peduncle as long or shorter. Sepals .2 in. long, pubescent. Corolla primrose yellow, dirty white or more or less dark violet, 1.25 in. long, 1 in. wide, inflated above, narrow below. Capsule 1 in. long, solid base, .35 in. long. *Hab.* Introduced in 1876, and now common in hedges in Singapore and Penang. It varies in colour of flowers from pale yellow to white and pale or dark violet. Native of India and Africa.

20. LEPIDAGATHIS, Willd.

Herbs or shrubby plants. Inflorescence of spikes or spike-like panicles. Bracts lanceolate or elliptic. Calyx of 5 lobes free nearly to base. Corolla-tube short, cylindric, limb 2-lipped. Stamens 4 in 2 pairs; anther-cells 2, parallel or one slightly above the other, not tailed. Capsule not clubbed. Seeds 4, orbicular pustulate. Species 60, tropics, but rare in America.

Spikes short, crowded sessile; flowers small (1) **L. incurva**

Spikes elongate with large bracts; flowers small, under
 .25 in. long (2) **L. Yappii**

Flowers 1 in. or more long.

Flowers dark red; bracts linear lanceolate (3) **L. longifolia**

Flowers white; bracts linear (4) **L. macrantha**

(1) **L. incurva** *Don, Prodr. Fl. Nep.* 119; *Clarke, l.c.* 672.
L. hyalina *Nees, Wall. Pl. As. Rar.* iii. 95.

Weedy plant, rooting at base and ascending to 2 ft. tall. Leaves lanceolate-oblong acuminate both ends nearly glabrous, 3 to 5 in. long, 1 in. wide; petioles winged half-way, 1 in. long. Spikes crowded, sessile several together terminal, hairy, .5 to 1.5 in. long. Bracts .4 in. long, lanceolate mucronate. Bracteoles .35 in. long. Sepals narrow lanceolate. Corolla .25 in. long, white, upper lobe chocolate. Anther-cells one below the other. Capsule .2 in. long, conic, top hairy. *Hab.* Abundant in waste ground in the north. Perak, Tambun. Penang, Penara Bukit; Waterfall (all collectors). Perlis, Chupeng. Kedah, Gunong Geriang. Lankawi (Ridley). *Distrib.* India, China, Malaya.

(2) **L. Yappii** *Ridl.*

Herb about 1 ft. tall. Leaves opposite, equal ovate sub-acute, base shortly cuneate, edge undulate; nerves beneath 7 pairs and midrib appressed hairy; 6 in. long, 3 in. wide; petioles hairy, 1 in. long. Panicle terminal of 4 or 5 spikes, 4 to 6 in. long. Spikes 2 or more in. long, densely hairy. Bracts elliptic acute at both ends, hairy especially on the edge, .4 in. long, .2 in. wide. Flowers solitary, small, sessile. Calyx-lobes linear acuminate hairy, .1 in. long. Corolla-tube short and thick, shorter than sepals, upper lip narrow-oblong, .2 in. long, entire, lower lip trifold, lobes blunt hairy. Stamens 4; filaments slender in two pairs; anthers linear, the upper pair with cells unequally placed, no appendages.

Style simple slender. Capsule .5 in. long, base solid part not dilate flattened acute. Seeds 4, orbicular, pustulate, retinacula large. *Hab.* Perak, Gunong Inas at Sira Rimau (Yapp, 553).

(3) *L. longifolia* Wight, *l.c. Pl. Ind. Or. t.* 1564; *Clarke, l.c.* 672.

A tall-stemmed half shrub, usually about 3 ft. tall. Leaves lanceolate, rather thin, long acuminate at both ends, glabrous, 6 to 9 in. long, 1.5 in. wide or more; petioles .7 in. long. Panicles of racemes 4 to 9 in. long, pubescent. Flowers numerous subsessile, secund. Bracts lanceolate acute, broad, .3 in. long. Sepals .5 in. long, lanceolate. Corolla 1 in. long, tube dull, brownish purple. Anther-cells at equal height. *Hab.* Common in forests, Johor, Batu Pahat; Sedenah. Muar, Lanadron (Curtis); Bukit Keyar (Fox). Malacca, Ayer Panas; Base of Mt. Ophir; Merlimau (Derry). Negri Sembilan, Perhentian Tinggi. Pahang, Kota Glanggi; Pulau Tawar. Selangor, Kwala Lumpur (Curtis); Petaling; Labu River; Rawang (Kloss). Perak, Sungkai (Kunstler); Ulu Bubong (Kunstler); Tapah (Wray); Changkat Mentri (Kloss). *Distrib.* Linga. *Native name:* Penluroh.

Abundant as this plant is in our forests, no one as yet has ever seen a fruit, and it would not fruit in Singapore Gardens.

(4) *L. macrantha* Clarke, *l.c.* 673.

Bracts lanceolate at top upper nearly linear, .75 in. long by .125 in. wide. Corolla white pubescent without, 1.3 in. long, otherwise as in *L. longifolia*. Perak, at 300 ft. altitude (Wray).

I have not seen this plant.

EXCLUDED

L. CHLOROSTACHYA Nees, "Penang, Pulau Poongah, Curtis," *Clarke, l.c.* 672. Pungah is in Siam.

21. BARLERIA, Linn.

Herbs, prickly or not. Leaves opposite or whorled, two of a whorl often reduced to spines. Spike terminal. Bracts large. Calyx large of 4 segments, 2 inner ones smaller. Corolla-tube cylindric, 1 in. long. Stamens 2; anther-cells 2 at equal heights; stigmas 2, short. Capsule ovoid. Seeds 2 to 4, villous or not. Species 120, chiefly African and Indian, a few American.

Spiny plant; flowers yellow (1) *B. prionitis*

Not spiny; flowers blue.

Spikes long; bracts narrow (2) *B. conspicua*

Flowers sub-solitary; bracts broad ovate (3) *B. siamensis*
var. *glabrescens*

(1) *B. prionitis* Linn. *Sp. Pl.* 636; *Clarke, l.c.* 673.

Shrubby, 1 to 3 ft. tall. Leaves firm, elliptic blunt, narrowed to both ends, 2 to 5 in. long, .3 to 1 in. wide; petioles slender, .25 in. long, interpetiolar spines up to .75 in. long. Spike terminal and flowers also axillary. Bracts lanceolate. Sepal posticous, .5 in. long. Corolla buff yellow, tube .5 in. long. Capsule ovoid,

beaked, broad, .5 to .7 in. long. Seeds 2. *Hab.* Malacca in a gravel pit, Bukit Sabukor (all collectors), no doubt an escape, but collected by Griffith in 1842. Perlis, Tebing Tinggi (apparently wild) (Ridley). *Distrib.* Africa and India.

(2) ***B. conspicua*** Nees in *Wall. Pl. As. Rar.* iii. 92; *Clarke, l.c.* 674.

Tall-branched glabrous unarmed plant. Leaves elliptic long acuminate at both ends, 8 in. long, 2 in. wide; petioles 1 in. long. Spikes terminal, 3 to 5 in. long, with narrow lanceolate leafy bracts, .8 in. long, .1 in. wide, strigose on back and edge. Sepals lanceolate, as long. Corolla blue, 1 in. long, lobes rather narrow blunt, about 1 in. across. Capsule .75 in. long, narrow-oblong, 4-seeded. *Hab.* Penang (Wallich, No. 2460) collected in 1822 and never seen again anywhere.

(3) ***B. siamensis*** Craib, *Kew Bulletin*, 1911, p. 437. var. *glabrescens*.

Herb, woody at base, 1 ft. tall; branches sparsely hairy. Leaves elliptic bluntly cuspidate, base acuminate, glabrous except the midrib in adult, midrib and nerves appressed hairy; nerves 6 pairs; 3.5 in. long, 1.5 in. wide; petioles .25 in. long, hairy. Flowers few sessile apparently blue, terminal in a pair of large ovate-acute bracts, 1 in. long, .6 in. wide. Sepals linear acute, hairy on the edge, short. Corolla large, tube cylindric, 1.5 in. long above, dilate, limb .75 in. long, upper lip 2-lobed, lobes broad, round, lower lip trilobed, lobes longer, oblong truncate, all glabrous. *Hab.* Lankawi, Dayong Bunting (Robinson, Nov. 1916).

The original *Barleria siamensis* Craib is a much larger plant, 5 ft. tall, the leaves 8 in. long and 3 in. wide, and is also much hairier. It was obtained in Siam at Doi Sutep and Doi Ker, at 2300 to 3000 ft. altitude.

22. PSEUDERANTHEMUM, Radlk.

Shrubs, from a few inches to 6 ft. tall. Leaves equal nearly or quite glabrous. Panicles narrow, or reduced to spikes, terminal. Bracts linear, small. Sepals linear pubescent free nearly to base. Corolla white, violet or lilac, tube long, slender, cylindric not dilate, lobes 5, flat elliptic sub-equal, not 2-lipped. Stamens 2, filaments very short; anther-cells parallel oblong, at equal height. Style long; stigmatic lobes equal minute. Capsule base linear, solid with 2 or 4 seeds in the dilated upper part. Seeds ovoid, flat corrugate. Species 90, Africa, Asia, America.

The original *Eranthemum* Linn. was intended for a plant known now as *Dædalacanthus*, but T. Anderson in breaking up the genus *Eranthemum*, to which had been added the plants now known as *Pseuderanthemum*, unfortunately retained the name for the latter. Popularly, these plants are known as *Eranthemum*, many being cultivated in our gardens.

Leaves pubescent hairy (1) ***P. hirtipistillum***

Leaves glabrous or nearly so.

Dwarf shrublets.

Corolla pale pink, tube .5 to .6 in. long; spike

3 to 6 in. long (2) ***P. crenulatum***

- Corolla grey, tube .25 in. long; panicle 1.5 in. long . . . (3) *P. breviflos*
 Corolla white, tube .5 to .6 in. long . . . (4) *P. candidum*
 Tall shrubs; panicles long, dense.
 Corolla-tube .5 to .6 in. long.
 Sepals very short linear.
 Lateral branches of panicle short . . . (5) *P. caudifolium*
 Lateral branches 1 in. long . . . (6) *P. selangorense*
 Sepals .25 in. long, lanceolate . . . (7) *P. sylvestre*
 Corolla-tube 1 in. long or more.
 Dwarf plant. Corolla-limb small, white . . . (8) *P. Kingii*
 Big bush. Corolla-limb broad, lilac; leaves broad . . . (9) *P. graciliflorum*
 Bush. Corolla nearly white; leaves narrow, long . . . (10) *P. lilacinum*
 Sarmentose bush; leaves broad; corolla white . . . (11) *P. Teysmanni*

(1) *P. hirtipistillum* Ridl. *Eranthemum hirtipistillum* Clarke, l.c. 675.

Shrub 2 ft. tall; stem and leaves pubescent. Leaves elliptic, caudate-acuminate or blunt, 6 to 8 in. long, 2.75 to 3 in. across; petioles 2 in. long. Panicles of 1 to 3 branches spicate with distant clusters, 4 to 9 in. long, pubescent; bracts linear, .175 in. long. Corolla pale pink, tube .5 in. long, slender, lobes hardly .3 in. long. Ovary and style-base hairy. Capsule 1 in. long, hairy. Seeds 4. *Hab.* Perak Tapah (Wray). Rare.

(2) *P. crenulatum* Radlk. *Sitzb. Math-Phys. Akad. Wiss. Muench.* xiii. 282. *Eranthemum crenulatum* Nees, in *Wall. Pl. As. Rar.* iii. 107; *Bot. Reg. t.* 879, not of Clarke. *E. porphyranthos*, Clarke, l.c. 675.

Dwarf shrub about 6 to 18 in. tall, generally unbranched. Bark pale. Leaves elliptic or lanceolate sub-acute, base narrowed but very variable, 3 to 4.5 in. long, 1.25 to 1.5 in. wide; petioles .2 in. long. Spikes 1 to many, slender pubescent, 4 to 6 in. long. Flowers sessile in opposite pairs. Sepals lanceolate acuminate, .1 in. long. Corolla-tube very slender, .25 in. long, lobes rounded nearly .5 in. across, pale pink violet. Capsule .7 in. long with 4 seeds slightly constrict between the seeds. *Hab.* Common in woods. Pahang, Kwala Tembeling. Malacca, Machap-Tebong Road (Derry); Nyalas. Negri Sembilan, Gunong Angsi; Tampin. Selangor, Batu Tiga; Ginting Bidai; Batu Caves. Perak, Temengoh; Ipoh; Kwala Kangsa; Changkat Mentri (Kloss); Dindings, Lumut. Redang Group (Yapp). Penang (Wallich), Waterfall, etc. (Curtis), Kedah, Gunong Geriang; Kedah Peak (Robinson). Perlis. Kelantan, Chaning Woods. Tringganu, Bundi (Rostados). *Distrib.* Siam, Cambodia. *Native name:* Ngaru Bukit.

Nees added as varieties some Indian plants closely allied, but probably distinct, but it is perfectly clear what plant he intended. The leaves vary very much: from Kedah Peak at 1500 ft. altitude we get a form with oblong

leaves 4 by 1 in.; in stony ground by Penang Waterfall the leaves are short and rounded. When the tip is cut off the plant often branches; this is the var. *evolutior* Clarke, l.c.

(3) **P. breviflos** Ridl. *Eranthemum breviflos* Clarke, l.c. 676.

A small woody crooked-stemmed plant, glabrous, 4 to 8 in. tall. Leaves elliptic, shortly acute, base shortly narrowed; nerves 6 pairs, conspicuous; 2 to 4 in. long, 1.25 to 2.25 in. wide; petioles .5 in. long. Panicle 1.5 in. long of 6 to 12 flowers; peduncle .5 in. long; pedicels short or none. Sepals .125 in. long, linear, pubescent when young. Corolla grey, tube .25 in. long, cylindric, lobes very short. Capsule linear-oblong, .8 to 9 in. long. Seeds 4. *Hab.* Perak, Goping (Kunstler). Rare.

Probably not an *Eranthemum*, but the specimens are very poor.

(4) **P. candidum** Ridl. *Eranthemum candidum* Ridl. *Journ. Roy. As. Soc. S. Br.* 86, p. 305.

A glabrous, simple unbranched plant about 2 ft. tall. Leaves lanceolate-acuminate at both ends, membranous; nerves 8 pairs ascending; 5 to 6 in. long, 1.5 to 2 in. wide; petioles .75 in. long. Racemes 6 in. long; peduncles 6 to 9 in. long. Flowers distant, solitary or paired; pedicels .1 in. long. Bracts lanceolate-acuminate from a wider base shorter. Calyx puberulous, lobes linear-acuminate, .1 in. long. Corolla pure white, tube .5 in. long, base cylindric then thickened midway upwards; lobes elliptic blunt, .5 in. long, .25 in. wide, sub-equal. Stamens in the base of the dilate portion of the tube. *Hab.* Forests by streams, Selangor, Ulu Gombak (Ridley).

(5) **P. caudifolium** Ridl. *Eranthemum caudifolium* Clarke, l.c. 676.

Shrub 4 to 5 ft. tall, branched, sparse pubescent. Leaves elliptic-lanceolate caudate-acuminate thin, base long-narrowed, 7.5 in. long, 2.5 in. wide; petioles .25 in. long (upper) to 2 in. long (lower ones). Spike many-flowered, 4 to 6 in. long, brown pubescent. Flowers white in dense opposite cymes. Sepals linear caudate pubescent. Corolla .5 in. long, base cylindric, limb .25 in. across. Capsule 1 in. long. Seeds 4 above. *Hab.* Forests; scarce. Dindings, Pulau Sembilan (Ridley). Perak (Scortechini).

(6) **P. selangorense** Ridl. *Eranthemum selangorense* Clarke, l.c. 677.

Shrub, minutely pubescent. Leaves 5 to 6 in. long, 2.5 in. wide, elliptic acuminate, base obtuse or rounded. Panicle 3 by 1 to 2 in. long, lower branches sometimes much developed, 1 in. long, carrying 3 to 6 flowers. Sepals scarcely .175 in. long. Corolla-tube .6 in. long, otherwise as in *E. caudifolium*. *Hab.* Selangor, Sungei Buluh (Goodenough, No. 10547); Kwala Lumpur (Curtis, No. 2367).

The plant collected by Goodenough, No. 10547, differs much from this description, the plant is not pubescent, the leaves are 4 in. long or less elliptic

cuspidate, the condensed panicle is 1·5 in. long, with 15 or 16 flowers on each basal branch, the corolla-tube is ·75 in. long and the lobes are ·25 in. long, but this is one of Clarke's types.

(7) ***P. sylvestre* Ridl.**

Shrub. Leaves elliptic-obovate cuspidate, base acuminate to lanceolate with a long point and undulate margins; nerves 7 pairs, conspicuous; 7 in. long, 3 in. wide, or 8 by 2 in.; petioles 1·5 in. long. Panicle 8 in. long above and bracts puberulous; branches very short with 1 or 2 flowers. Bracts very narrow, linear-acuminate. Calyx-lobes lanceolate-acuminate, ·35 in. long. Corolla-tube ·6 in. long, lobes oblong round-tipped, ·5 in. long, ·25 in. wide, white. *Hab.* Forests, Selangor, Sungei Buluh (Ridley).

(8) ***P. Kingii* Ridl.** *Eranthemum Kingii Clarke, l.c.* 678.

Slender, little or not branched plant, 1 ft. tall. Leaf pairs distant, few, elliptic acuminate shortly narrowed to base, 3 in. long, 1·25 to 1·5 in. wide; petioles ·25 in. long. Spike terminal one unbranched, pubescent, 3 in. long. Flowers in opposite pairs, sessile. Sepals lanceolate acuminate, pubescent. Corolla-tube 1 in. long; limb ·5 in. wide, pure white. *Hab.* Damp woods in the south. Singapore, Changi; Jalan Bray; Selitar. Johor; Jaffaria (King); Kota Tinggi; Gunong Muntahar (Kloss).

(9) ***P. graciliflorum* Ridl.** *Eranthemum graciliflorum Nees, Wall. Pl. As. Rar.* 107. *E. malaccense Clarke, F.B.I.* iv. 498; *Journ. As. Soc. Beng, l.c.* 678.

A bush with erect stems about 6 ft. tall. Leaves lanceolate to ovate-lanceolate-acuminate both ends, 5·5 to 6 in. long, 1 to 2 in. wide; petioles ·35 in. long. Flowers sub-sessile, numerous, in a dense spike, about 2 in. long. Calyx very small with short lobes. Corolla-tube slender, 1·5 in. long; limb 1 in. across, lilac-violet with a white spot on lower lip dotted red, occasionally not spotted, or all white. Capsule 1 in. long, foot as long as dilate portion. Seeds 4. *Hab.* Common in forests in low country, and often cultivated in gardens. Muar (Curtis). Malacca, Sungei Hudang; Bukit Sabukor (Derry). Pahang, Pekan. Selangor, Sungei Buluh; Rantau Panjang (Kloss). Negri Sembilan, Johol. Perak, Kamuning (Curtis, a white-flowered form); Changkat Mentri (Kloss). Province Wellesley, Kubong Ulu (Curtis). Penang, Waterfall Hill; by the Kosea River (Porter). Lankawi, Kwah (Curtis). Perlis, Chupeng. *Distrib.* South Siam. *Native names:* Tampan Putri; Seluang Mudik. *Use:* Drug after confinement.

Curiously, this common widespread shrub very rarely fruits. Wallich's type has broader leaves than usual, but the shrub varies in this.

(10) ***P. lilacinum* Stapf, Bot. Mag. t.** 8446.

This plant was sent by me from Selangor, Batu Caves, to Kew Gardens in 1909. It was cultivated there in a pot and appeared as an erect plant with narrow lanceolate acuminate leaves 9 in.

long, 2 in. wide, upper ones smaller and a panicle 5 in. long of very pale violet nearly white flowers nearly 1 in. across.

I believe it to be only *P. Teysmanni* altered by cultivation.

(11) **P. Teysmanni** Ridl. *Eranthemum Teijsmanni* Clarke, l.c. 679.

Sarmentose shrub with many branches. Leaves dark green, oblong or ovate or lanceolate caudate acuminate, base round or narrowed, 3 to 5 in. long, 1 to 2.5 in. wide; nerves conspicuous, 6 pairs; petioles 1 in. long. Panicles spiciform occasionally branched at base, 6 or 8 in. long. Flowers 2 to 3 in short cymes about .15 in. long. Calyx-lobes lanceolate acuminate. Corolla-tube cylindric, 1.75 in. long; lobes oblong, rounded at tip, all pure white or occasionally faintly tinted lilac. *Hab.* Common in forests and by rivers. Johor, Castlewood. Malacca, Merlimau (Derry). Selangor, Batu Caves; Ginting Bidai; Semangkok Pass; Menuang Gasing (Kloss). Perak, Ulu Temengoh; Kamuning; Tapah (Wray). *Native name*: Akar Ulo.

I retain Clarke's name for this. *E. Teijsmanni* T. Anders., was recorded in *Journ. Agri.-Hort. Soc. India*, I. 285. It was never actually described except as a climber, and was obtained from the Buitenzorg Gardens.

EXCLUDED SPECIES

E. ALBUM Nees, Clarke, l.c. 677, Malacca (Griffith), is apparently *E. graciliflorum*, certainly not *E. album*.

E. ACUMINATISSIMUM Miq. *Fl. Ind. Bat.* ii. 835. *E. Andersonii* Masters. *E. Blumei* Anderson. Anderson says he found it in forests near Singapore. It has long been cultivated there, but has not even run wild. Probably native of Sumatra.

23. CLINACANTHUS, Nees

Rambling shrub with narrow leaves and conspicuous red flowers in large terminal clusters on the ends of branches. Bracts small, linear. Sepals equal linear. Corolla-tube narrow, funnel-shaped; limb 2-lipped. Stamens 2; anthers 1-celled. Capsule stalked, 1-seeded. Species 1.

(1) **C. Burmanni** Nees, in *DC. Prodr.* x. 511.

Leaves 3 in. long, .5 to .8 in. wide, lanceolate acuminate, base round; petioles .25 in. long. Cymes 5- to many-flowered, pubescent. Sepals .25 in. long, hairy. Corolla orange red, 1.25 in. long. *Hab.* Malacca (Maingay) probably from a garden. *Distrib.* Siam, China, Borneo.

24. CALOPHANOIDES, Ridl.

Branched shrubby plant with short narrow leaves. Flowers densely clustered in axils. Bracts very small or 0. Calyx-lobes 5, linear. Corolla very small, white. Stamens 2; anther-cells 2,

one below the other, tailed. Capsule linear, solid portion very short. Seeds 4, verrucose-tubercled. Species 2 or more, Indo-Malayan.

(1) *C. quadrifaria* Ridl. *Justicia quadrifaria* Wall. *Cat.* 2479; *Clarke, l.c.* 684.

About 2 ft. tall or less. Leaves narrow-lanceolate or elliptic acuminate at both ends, 1.5 to 4 in. long, .2 to 1 in. wide, glabrous; petioles 0 to .35 in. long. Flowers white, spotted rose. Calyx-lobes pubescent, .25 in. long. Corolla .25 in. long. Capsule .25 in. long, solid pedicel very short. *Hab.* Stream banks, rocky and sandy spots, Singapore, Changi. Selangor, Batu Caves (Curtis). Perak, Ulu Temengoh; Kwala Kenering; Ulu Selama (Kunstler). Kelantan River near Kwala Lebir, etc., common. *Distrib.* India, Sumatra, China.

Justicia Neesiana T. Anders., *C. Neesiana* Ridl. is a more condensed, narrower-leaved form. I have not seen it from our region. The specimens given for it by Clarke, *l.c.* 684, are not the same species as the type which was collected by Wallich at Amherst. Clarke's *J. Neesiana* from Perak are only narrow-leaved dwarf plants of *J. quadrifaria*. The genus seems to me quite distinct from typical *Justicias*.

25. GENDARUSSA, Nees

Shrubs with narrow leaves. Flowers pinkish white in a condensed panicle, clustered. Bracts small. Sepals 5. Corolla-tube narrow. Stamens 2, one anther-cell a little below the other tailed. Capsule clavate, 4-seeded. Species 1.

(1) *G. vulgaris* Nees, *Wall. Pl. As. Rar.* iii. 104; *Wight, Ic.* t. 468. *Justicia Gendarussa* Linn. *fil. Suppl.* 85; *Clarke, l.c.* 686.

Erect bush woody below, 2 to 4 ft. tall. Stems purple. Leaves lanceolate, glabrous, midrib purple, 4 to 5 in. long, .5 in. wide; petioles .25 in. long. Panicles 3 in. long. Calyx green, spotted purple, viscid pubescent. Corolla .5 in. long, tube greenish white tinted pink, lower lip spoon-shaped, white, spotted pink; anthers lemon yellow. Style pink. Capsule .5 in. long. *Hab.* Common in villages and near gardens over the whole peninsula, very rarely, if ever fruiting here. *Distrib.* All eastern Asia. *Native name:* Ganda rusa. *Use:* As a drug for rheumatism and to ward off demons.

26. JUSTICIA, Linn. (in part)

Herbs. Leaves opposite. Inflorescence a terminal spike. Bracts often large. Calyx deeply 5-cleft. Corolla small, little longer than calyx, lower lip ribbed, yellow or white. Stamens 2, one anther below the other and tailed. Capsule 4-seeded, stalked with the seeds only in the upper part on elastic placentæ. Species about 100, tropics.

Linne's original genus was a mixture of several, and Lindau's in the *Pflanzenreich* even wider. I retain under it simply the set typified by *J. Betonica* Linn., and as a section *Henicophyllæ*, which might very well be separated as a genus also.

i. SPATHULIFERÆ. Bracts broad, subspathulate, green distinctly clawed, longer than flowers.

Flowers 1 to a bract; bract edged with stiff white hairs.

Corolla glabrous (1) *J. ptychostoma*

Corolla hairy outside (2) *J. patulinervis*

Flowers 1 to a bract; bract not hairy on edge.

Bracts orbicular (3) *J. rupestris*

Bracts ovate (4) *J. Scortechinii*

Bracts obovate (5) *J. pubiflora*

Flowers 2 or 3 to a bract.

Bracts medium clawed not ciliate (6) *J. subcymosa*

Bracts large purple, not ciliate (7) *J. selangorensis*

Bracts medium, not clawed ciliate (8) *J. lætevirens*

Bracts large, oblong, green (9) *J. vegeta*

Bracts ovate, green puberulous; shrubby plant (10) *J. Robinsonii*

ii. LANCIBRACTEATÆ. Bracts as long as the flowers, lanceolate, linear or oblong.

Bracts linear acute, ½ in. long (11) *J. breviflos*

Bracts ½ in. long.

Spikes short, few-flowered (12) *J. bracteata*

Spikes long; flowers secund.

Bracts and calyx glabrous (13) *J. secundiflora*

Bracts and calyx hairy (14) *J. odontites*

iii. BREVI-BRACTEATÆ. Bracts much shorter than flowers; racemes dense.

Weak herb; flowers not secund (15) *J. vasculosa*

Stout herbs; spikes secund or sub-sekund, 2 to 3 in. long.

Bracts ovate as long as the calyx (16) *J. pectinella*

Bracts narrow linear-lanceolate (17) *J. Clarkeana*

Bracts lanceolate.

Flowers yellow; fruit ½ in. long (18) *J. uber*

Flowers cream pink spotted; fruit ¼ in. long (19) *J. microcarpa*

Spike 8 to 10 in. tall; flowers whorled (20) *J. valida*

Spikes elongate; flowers distant.

Spikes shortly sparingly branched (21) *J. Maingayi*

Panicle 1½ in. long; branches few, ½ in. long; flowers ½ in. long (22) *J. lancifolia*

Inflorescence paniced with long slender branches.

Leaves herbaceous, 6 by 3 in. (23) *J. sumatrana*

Leaves membranous ovate, 5 by 3 in. (24) *J. ovalis*

Leaves sub-coriaceous, 5 by 2 in. or less (25) *J. remotifolia*

iv. HENICOPHYLLÆ. Leaves distant alternate or with one leaf smaller than the other.

Glabro plants; leaves alternate.

Slender plant, internodes long (26) *J. henicophylla*

Much-branched shrub (27) *J. subalternans*

Leaves hairy beneath (28) *J. alternifolia*

Leaves one much smaller than the other.

Base round (29) *J. otophora*

Base cuneate (30) *J. inconspicua*

(1) *J. ptychostoma* Nees, Wall. Pl. As. Rar. iii. 108; Clarke, l.c. 682.

A weedy herb, nearly or quite glabrous, about 1 ft. tall, seldom more, branched. Leaves elliptic-lanceolate acuminate, base cuneate, edges undulate, 4 to 6 in. long, 2 to 2½ in. wide, generally

equal; petioles .5 to 1.5 in. long. Peduncles axillary and terminal, 1 to 2 in. long; spike lengthening to 4 in. long; bracts racket-shaped edged with crystalline spines green, .3 in. long, stalk purple; sepals linear purple. Corolla .5 in. long, tube and upper lip greenish, lower lip white, palate strongly ribbed. Capsule .5 in. long, 4-seeded. Seeds warty. *Hab.* Common near villages, orchards and thickets. Pahang River. Malacca, Selandor. Negri Sembilan, Bukit Sulu (Cantley). Selangor, Batu Caves. Perak, Kwala Kenering; Kamuning; Gunong Arang (Scortechini); Simpang (Wray). Penang (Wallich); Balik Pulau (Curtis). Kedah, Yan. Lankawi (Curtis). Perlis, Kanga. Kelantan, Chaning.

var. *angustifolia* Clarke. Leaves lanceolate or linear-lanceolate, Perak, Gunong Inas (Wray).

var. *rotundifolia* Clarke. Leaves round at base, 6 in. long, 3.5 in. wide, Dindings, Pangkor (Ridley).

var. *auriculata* Clarke. Leaves broad, base narrowed shortly unequally oblong cordate, Dindings, Pulau Rumbia (Seimund). Perak, Thaiping (Kunstler); Ipoh (Burkill).

var. *parvibracteata* Clarke. A weak form; spikes small, interrupted at base. Bracts very small. Dindings, Gunong Tungul. Perak, Goping (Kunstler). *Native names:* Gendarussa Bukit; Sebonkak.

(2) ***J. patulinervis* Clarke, l.c. 683.**

Sparingly pubescent. Leaves 6 by 4 in., crenate, truncate at base, very shortly cuneate on petiole; nerves 10 to 11 pairs, spreading at right angles from the midrib. Spike dense; bracts nearly glabrate with some white bristles on edge, otherwise like *J. pubiflora*. *Hab.* Perak (Scortechini).

I have not seen this plant.

(3) ***J. rupestris* Ridl. Journ. Roy. As. Soc. S. Br. 59, p. 153.**

Plant slightly woody branched, 12 to 18 in. tall; young parts hairy. Leaves lanceolate acuminate at both ends, sub-coriaceous, glabrous except midrib on both sides appressed yellow-hairy, 5 in. long, 1 in. wide or less; petioles .25 in. long, winged to base, edged with white hairs. Spikes terminal, 1 in. long. Bracts orbicular, petioled, nearly .25 in. long, pubescent. Calyx .1 in. long, pubescent. Corolla white hairy, tube shorter than limb. Capsule .4 in. long, pubescent. Seeds flat, reticulate. *Hab.* Rocks in the north. Rare. Perlis, Bukit Lagi, Kanga (Ridley).

(4) ***J. Scortechinii* Clarke, l.c. 683.**

Branched herb. Leaves rather fleshy, ovate or elliptic acuminate, usually rounded at base, crenulate, nerves 6 to 7 pairs; 3 to 5 in. long, 1.25 to 3 in. wide; petioles .2 in. long. Spikes dense. Bracts ovate, small. Corolla hairy outside. Capsule hairy nearly to base. *Hab.* Perak, Maxwell's Hill 3000 ft. altitude (Scortechini), rare and little known.

(5) ***J. pubiflora* Clarke, l.c. 683.**

Herb 3 to 4 ft. tall, glabrous. Leaves ovate to elliptic-lanceolate long acuminate, base round or short cuneate, 4 to 6 in. long, 1.5 to 2.25 in. wide; petioles 1 in. long. Bracts thickly tomentose outside, edge not bristly. Calyx pubescent. Corolla very hairy "yellow striped grey." *Hab.* Forests; scarce, Johor, Pulau Kukub; Tempayan River (Ridley). Perak, Larut Hills at 4200 ft. altitude (Kunstler).

(6) ***J. subcymosa* Clarke, l.c. 683.**

One to 3 ft. tall, base decumbent, glabrous. Leaves rather thin ovate or almost lanceolate-acuminate, base round or shortly cuneate, 5 to 9 in. long, 2.5 to 3.25 in. wide; petioles .5 to 2 in. long. Spike terminal, 4 in. long, lengthening to 8 in. long. Flowers in small distant cymes of 3 to 7, pubescent. Bracts .25 in. long, pubescent with spines on edge. Sepals pubescent. Corolla pale yellow, pubescent. Capsule nearly .7 in. long, hairy to base. *Hab.* Not rare; in thickets and woods. Selangor, Batu Caves; Dusun Tua; Ginting Bidai. Perak, Lenggong; Ulu Bubong and Chanderiang (Kunstler). Kedah, Gunong Geriang. Penang, Pulau Betong (Curtis). Perlis, Tebing Tinggi.

(7) ***J. selangorensis* Clarke, l.c. 684.**

Robust plant. Leaves rather fleshy elliptic shortly acuminate, base blunt or cuneate, stout, nerves and midrib conspicuous purple, 9 in. long, 4.5 in. wide; petioles 4 in. long. Peduncle .75 in. long, pubescent. Spike 4 in. long. Bracts ovate to obovate, .6 in. long, sessile puberulous, purple. Flowers 2 or 3 in a bract. Calyx small, glabrous. Corolla white or dirty white with violet blotches. Capsule .35 in. long, glabrous. *Hab.* Forests; Selangor, Ginting Peras (Ridley). Lankawi, Kwah (Curtis).

(8) ***J. lætevirens* Ridl. Journ. Roy. As. Soc. S. Br. 57, p. 82.**

Herb about 2 ft. tall; stem pubescent. Leaves ovate to ovate-lanceolate acuminate acute, base broad or slightly narrowed to base, velvety-hairy both sides, 4 to 6 in. long, 3 to 3.5 in. wide; petioles 1 in. long. Spike up to 9 in. long. Bracts ovate acute, bright green, hairy, edge ciliate, .25 in. long, persistent, narrowed to base not clawed. Flowers 2 or 3 together. Sepals lanceolate acuminate longer than the tube, white-hairy. Corolla .4 in. long, yellow-hairy. Capsule .5 in. long, 4-seeded. *Hab.* In forests, local. Perak, Temengoh (Ridley).

Justicia lætevirens Buckley, an American plant, has long been referred to the genus *Gatesia*.

(9) ***J. vegeta* Ridl. Journ. F.M.S. Mus. v. 42.**

A tall, stout glabrous plant. Leaves lanceolate both ends acute; midrib broad; nerves 12 pairs; 8 in. long, 3 in. wide; petioles 1.5 in. long. Racemes axillary, 1.5 in. long on a pedicel .25 to .5 in. long. Bracts oblong-ob lanceolate blunt, .4 to .5 in. long. Flowers solitary. Sepals lanceolate. Corolla .5 in. long,

glabrous, yellow purple-striped. Capsule nearly straight, little dilate, 4-seeded. *Hab.* Selangor, Gunong Mengkuang Lebah (Robinson), rare.

var. *terminalis* Ridl. Branched herb. Leaves elliptic-lanceolate, long acuminate, base long narrowed glabrous; nerves slender ascending; 5 to 7 in. long, 2 to 2.25 in. wide; petioles .5 in. long. Spikes terminal, 2 to 2.5 in. long in fruit. Bracts, upper oblong, lower ones spatulate narrowed at the base, .4 in. long, .2 in. wide, persistent. Capsule shorter than the bracts, .2 in. long with 2 strong hooked retinacula. Seeds 2, purple brown orbicular verrucose. *Hab.* Selangor, Menuang Gasing (Kloss).

This is possibly specifically distinct.

(10) **J. Robinsonii** Ridl. *Journ. Roy. As. Soc. S. Br.* 86, p. 305.

Shrubby, glabrous except the inflorescence. Leaves lanceolate acuminate, base cuneate; nerves 7 pairs; 7 to 10 in. long, 2 to 3 in. wide; petioles .5 in. long. Racemes solitary, rarely 2, terminal, sub-sessile, 1 in. long; rachis pubescent. Corolla .25 in. long, tube short thick cylindric, little longer than sepals, upper lip lanceolate blunt, lower limb 3-lobed, lobes rather broad blunt, all dirty white spotted purple. Stamens 2; anther-cells not parallel, one shortly prolonged below. Capsule .5 in. long, lower half solid, upper half ovate flattened, acute. Seeds 2, orbicular pustular. *Hab.* Lankawi, Dayong Bunting and Burau (Robinson).

(11) **J. breviflos** Ridl. *l.c.* 82, p. 187. *J. flaccida* Ridl. *Journ. Roy. As. Soc. S. Br.* 57, p. 82 (not of Kurz).

Glabrous herb except young parts. Leaves flaccid, lanceolate to ovate-lanceolate acuminate to both ends, 5 to 9 in. long, 1 to 3 in. wide; petioles .5 in. or more long, pubescent, winged to base. Spike terminal, sub-sessile, 3 in. long. Bracts linear, green edged with purple, 1 in. long. Sepals filiform as long as corolla-tube, pubescent, tipped purple. Corolla glabrous, .25 in. long, yellow striped purple. Capsule .25 in. long. Seeds 4, verrucose. *Hab.* Forests, local. Perak, Temengoh (Ridley).

(12) **J. bracteata** Ridl. *Journ. F.M.S. Mus.* iv. 56. *J. inconspicua* Ridl. *Journ. F.M.S. Mus.* vi. 53; not *Journ. Roy. As. Soc. S. Br.* 61, p. 57.

A straggling herb 2 to 3 ft. tall, nearly glabrous. Leaves ovate to lanceolate acuminate or acute, base cuneate, midrib pubescent on back, 4.5 in. long, 1 to 2 in. wide; petioles pubescent, 1 in. long. Spikes axillary and terminal, 1 in. long. Bracts lanceolate or oblong sub-acute or blunt, green or purple. Sepals lanceolate-acuminate. Corolla under .5 in. long, white, upper lobe striped purple, lower lobe striped violet. Capsule glabrous, .5 in. long, clavate 4-seeded. *Hab.* Mountain forests 2000 to 4000 ft. altitude. Pahang, Telom, Gunong Berumbun. Selangor, Ginting Bidai (Ridley). Perak, Gunong Kerbau (Robinson) at 3600 ft. altitude.

(13) **J. secundiflora** *Ridl. Journ. Roy. As. Soc. S. Br.* 57, p. 86.

Erect or ascending herb 6 to 12 in. tall; stem brown-hairy. Leaves lanceolate or ovate acute, base narrowed, dark green often purple beneath, glabrous except nerves beneath, brown-hairy, 2 to 6 in. long, 2 to 2.75 in. wide; petioles 1 in. long. Spikes axillary or terminal, 3 in. long; peduncles .25 to .5 in. long. Rachis brown-hairy. Flowers sessile solitary secund. Bracts lanceolate-oblong narrow, .25 to .5 in. long, pubescent, dark purple. Sepals linear-lanceolate, pale dotted purple. Corolla .4 in. long, glabrous, tube cylindric, yellow dotted purple. *Hab.* Forests, local. Perak, Temengoh Woods (Ridley).

(14) **J. odontites** *Ridl. Journ. As. Soc. S. Br.* 82, p. 187.

A slender, erect puberulous simple herb 2 ft. tall. Leaves in pairs, 2 in. apart, lanceolate acuminate, base narrowed; nerves slender elevate beneath, 7 pairs pubescent beneath with very numerous bundles of raphides on both sides; 3 to 3.5 in. long, 1 to 1.5 in. wide; petioles .75 in. long, pubescent. Spike 2.25 in. long, hairy. Bracts lanceolate acute narrowed to base, upper ones nearly ovate or rhomboid, green-hairy, .24 in. long. Flowers numerous solitary, secund. Sepals lanceolate long-acuminate, narrow, green-hairy, longer than the corolla-tube. Corolla .5 in. long, hairy outside, pink, lower lip 3-lobed, lobes rounded; anthers narrow linear. Pistil glabrous. *Hab.* Johor, Kota Tinggi (Ridley). Rare.

(15) **J. vasculosa** *Wall. Cat.* 2469; *Clarke, l.c.* 687. *Leda andrographioides* *Clarke, l.c.* 692.

Weak straggling glabrous herb about 1 ft. tall. Leaves subequal or often very unequal ovate to elliptic-lanceolate acuminate, base narrowed, 5 in. long, 2 in. wide or less; petioles .5 in. long. Spikes 2 to 4 in. long, gradually lengthening, axillary, many-flowered, often several together. Bracts not longer than calyx, hairy. Sepals linear-lanceolate hairy. Corolla .5 in. long, yellow spotted with pink in mouth, pubescent. Capsule .6 in. long with 4 seeds. *Hab.* In woods. Singapore, Bukit Panjang; Chan Chu Kang. Johor. Sedenah. Negri Sembilan, Johol. Pahang, Tahan River; Telom. Perak, Tapah. Tomoh (Machado). Penang (Curtis). Kelantan, Kota Bharu. *Distrib.* Assam, Tenasserim, Sumatra.

(16) **J. pectinella** *Ridl. Journ. Roy. As. Soc. S. Br.* 61, p. 34.

Herb about 2 ft. tall, fleshy. Leaves ovate or oblanceolate, long narrowed to base acuminate; raphides many; 4 to 9 in. long, 1.5 to 3 in. wide; petioles .5 in. long, winged to base. Racemes terminal and axillary secund, 2 in. long. Bracts lanceolate-ovate acuminate, .1 in. long. Bracteoles ovate. Sepals subulate purple. Corolla .5 in. long. Capsule .5 in. long. Seed orbicular, pubescent. *Hab.* Forests up to 1500 ft. altitude. Johor, Gunong Pantai.

Pahang, Kwala Tahan; Kota Glanggi. Selangor, Ginting Sempah (Ridley).

(17) **J. Clarkeana** Ridl. *Rungia laxiflora* Clarke, l.c. 698.

Herb 3 ft. tall, nearly glabrous. Leaves elliptic-lanceolate, narrowed at each end, 3·5 to 4 in. long, 1 to 1·5 in. wide; petioles ·25 to 1 in. long. Spikes 1 to 3, terminal, 2 to 4 in. long. Flowers numerous, sub-second, lax. Bracts narrow linear-lanceolate, ·2 in. long. Bracteoles similar, smaller. Sepals very short, linear glabrous. Corolla ·6 in. long, "yellow striped grey." Stamens 2, lower anther-cells smaller than upper, spur white. Capsule ·35 in. long, minutely hairy; placentas rising elastically. *Hab.* Perak, Larut Hills, 3000 to 3200 ft. altitude (Kunstler).

Clarke puts this plant under *Rungia* and calls it *laxiflora*, after a Javanese plant called *Justicia laxiflora*, but seems doubtful if it is the same as Blume's *J. laxiflora*, as that had bearded filaments. I cannot see it bears any relation to the other species of *Rungia*, but it seems to be a true *Justicia*.

(18) **J. uber** Clarke, l.c. 688.

A rather fleshy herb about 2 ft., rarely 5 ft., tall, glabrous. Leaves broadly elliptic or more or less ovate acute, base narrowed; nerves puberulous beneath; 6 to 10 in. long, 3 to 4 in. wide; petioles ·5 to 1·25 in. long. Spikes 2 to 6 in. long, solitary or 2 or 3 on a peduncle up to ·5 in. long. Flowers usually unilateral. Bracts lanceolate acuminate, shorter than the calyx. Sepals narrow lanceolate acuminate. Corolla ·6 in. long, creamy yellow, nearly or quite glabrous. Capsule ·4 to ·6 in. long, 4-seeded, dilate in the seed-bearing portion. Seeds reniform orbicular, pustulate. *Hab.* Woods, common, Malacca, Bukit Sadanen. Negri Sembilan, Bukit Sulu and Bukit Burunang (Cantley). Selangor, Ginting Bidai; Batu Caves; Semangkok Pass. Perak, Ulu Bubong (Kunstler); Lenggong; Bujong Malacca. Kelantan, Kota Bharu. *Native names* : Puding hutan jantan; Suruput.

Some of the plants from the Batu Caves have small ovate bracts at the base of the flowers, and it is possible that there is more than one species included here.

(19) **J. microcarpa** Ridl. *Journ. Roy. As. Soc. S. Br.* 86, p. 206.

A thin weak plant, glabrous. Leaves lanceolate-ovate, thin, very shortly bluntly narrowed to the base; nerves 10 pairs; 6 in. long, 2 in. wide; petioles 1·25 in. long. Racemes solitary axillary and terminal, 2 in. long. Flowers crowded second. Bracts lanceolate acuminate slightly shorter than the calyx. Sepals narrow linear acuminate. Corolla ·3 in. long, cream with pink spots in the mouth. Fruit ·4 in. long. Seeds 4, ovoid acute, flat pustular. *Hab.* Thickets at the base of limestone cliffs, Selangor, Batu Caves (Ridley).

(20) **J. valida** Ridl. *Journ. Roy. As. Soc. S. Br.* 59, p. 152.

Tall, half-shrubby plant, glabrous except young parts and inflorescence. Leaves broad lanceolate, 8 in. long, 3·25 in. wide,

acuminate, blunt, base cuneate; nerves 8 pairs elevate beneath; petioles .5 to 1 in. long. Spike 8 to 10 in. long. Flowers sessile in whorls .1 to .5 in. apart. Bracts linear acute. Sepals lanceolate acuminate, hairy. Corolla .25 in. long, hairy, green, upper lobes spotted pink. Capsule glabrous, .5 in. long. Seeds reticulate. *Hab.* Among bushes in limestone rocks, local. Kedah, Gunong Geriang (Ridley).

(21) **J. Maingayi** Clarke, *l.c.* 687.

Shrubby slender plant 2 ft. tall. Leaves oblong-lanceolate, acuminate, crenulate or undulate, base cuneate, 4 in. long, .35 to 1.25 in. wide; petioles .1 in. long. Spikes terminal and lateral, elongate slender, 2 to 3 in. long, sometimes several on one peduncle. Sepals lanceolate-linear, pubescent. Corolla .5 in. long, pubescent. Capsule .35 in. long, 4-seeded at tip. *Hab.* Penang Hill (Maingay). Rare. Possibly a form of *J. vasculosa*.

(22) **J. lancifolia** Moore, *Journ. Bot.* 1922, p. 358. *Leda lancifolia* Ridl. *Journ. Linn. Soc.* xli. 295.

Stem shrubby, over 10 in. tall. Leaves lanceolate acuminate, long, narrowed to base, glabrous except the nerves below faintly scurfy, 5 in. long, 1.75 in. wide. Panicle of a few short branches, 1.5 in. or less long on a peduncle as long. Pedicels .1 in. long. Bracts linear, very small. Sepals linear acuminate, .2 in. long. Corolla .6 in. long, lower lip yellow, hairy, tube hardly as long as limb. Stamens 2; anther-cells parallel hairy. *Hab.* Forests, Selangor, Menuang Gasing, Ulu Langat (Kloss).

(23) **J. sumatrana** Clarke, *l.c.* 688.

Bushy herb. Leaves sub-equal, reddish beneath, broad-elliptic, narrowed to base, shortly acuminate, 6 in. long, 3 in. wide. Peduncles 4 to 6 in. long, bearing very lax panicles of about 5 slender spikes 4 to 5 in. long with flowers in distant clusters of 1 to 3. Bracts minute. Sepals lanceolate-linear. Corolla greenish white with purple spots, pubescent outside. Anthers black. Capsule .6 in. long, 4-seeded. *Hab.* Woods in mountain districts. Rare. Perak, Ulu Batang Padang (Wray); Kelantan, Kwala Aring (Yapp). *Distrib.* Sumatra.

(24) **J. ovalis** Ridl.

Stem 18 in. tall, puberulous with a line of short hairs running down one side. Leaves in equal pairs ovate acuminate-cuspidate blunt, base narrowed; nerves 6 to 7 pairs; 4.5 to 5 in. long, 2 to 3 in. wide; petioles slender, .5 in. long. Raceme terminal, slender, pubescent; peduncle 6 in. long. Flowers few. Sepals lanceolate setaceous, .1 in. long. Corolla .5 in. long, lower lip with 2 fleshy ridges on the sides, lobes short, oblong. Stamens 2, shorter than corolla; anther-cells not parallel, ellipsoid, lower one with a short blunt white process. *Hab.* Pulau Tioman, Juara Bay (Burkill).

(25) **J. remotifolia** Ridl. *Journ. Roy. As. Soc. S. Br.* 68, p. 12.

A tall slender straggling herb, 2 ft. tall, internodes 4 in. long.

Leaves equal ovate acuminate, base round or acuminate, thinly coriaceous, 3 to 5 in. long, 1·75 to 2 in. wide; petioles ·2 in. long. Panicles axillary and terminal, very slender, 6 to 8 in. long; branches 1 or 2, a line of woolly hairs on each side. Cymes numerous, distant, of 4 flowers; peduncles ·1 in. long, covered with small bracts. Sepals linear setaceous, as long as corolla-tube, pubescent. Corolla ·35 in. long, pale yellow, palate pubescent. *Hab.* Pahang, Temerloh (Burn-Murdoch).

(26) ***J. henicophylla*** Clarke, *l.c.* 685.

A sub-scandent herb, slender, 1 to 4 ft. tall. Leaves alternate, elliptic or ovate acuminate; base unequal, round or cuneate, 7 to 9 in. long, 2 to 2·5 in. wide; petioles 0 to ·25 in. long. Cymes paniced, 2 in. long, lax; peduncle 1 in. long, up to 40 flowers. Sepals linear. Corolla ·35 in. long, greenish cream-colour, palate spotted rose-purple, pubescent outside. Capsule ·7 in. long, base cylindric. Seeds 4 in upper part. *Hab.* Mountain woods, Selangor, Semangkok Pass. Perak, Tapah (Wray); Gunong Kerbau (Haniff); Ulu Bubong (Kunstler); Gapis Pass (Curtis).

var. *caudata* Clarke, *l.c.* Leaves caudate-acuminate, Perak, Goping (Kunstler).

var. *scandens* Clarke, *l.c.* Leaves less caudate, Perak, Goping (Kunstler). Both probably mere forms.

(27) ***J. subalternans*** Clarke, *l.c.* 685.

Spreading much-branched, 2 to 4 ft. tall, sub-glabrous. Leaves opposite, unequal (or one wanting) nearly sessile oblique, ovate acuminate, 2 to 4 in. long, 1 to 1·5 in. wide. Cymes short, 1 in. long, few-flowered. Sepals ·125 in. long, lanceolate, pubescent. Corolla white, reddish yellow inside. *Hab.* Perak, Kinta near Gunong Mesak (Kunstler). Rare.

(28) ***J. alternifolia*** Clarke, *l.c.* 686.

A shrub 2 to 3 ft. tall, hairy, zig-zag stem. Leaves alternate, ovate or oblong acuminate acute, base very unequal; nerves conspicuous and hairy beneath; 7 in. long, 3·5 in. wide; petioles ·1 to ·25 in. long. Cymes short, axillary, pubescent, few-flowered. Flowers "pale green yellow, cream colour inside." Capsule ·7 in. long, hairy, base cylindric. Seeds 4 at top. *Hab.* Perak, Ulu Slim (Kunstler). Rare and little known.

(29) ***J. otophora*** Clarke, *l.c.* 686. *J. sessilis* Ridl. *Journ. Roy. As. Soc. S. Br.* 57, p. 85.

Slender zig-zag puberulous climber. Leaves sessile in distant pairs, one ovate or lanceolate acuminate, base round, 1·5 to 3 in. long, ·5 to 1·25 in. wide; the other ovate-cordate, ·25 in. long. Cymes very slender axillary, ·5 to 1 in. long, few-flowered; peduncles ·3 in. long. Calyx half as long as corolla, pubescent. Corolla-tube oblong-cylindric, pubescent, white. Capsule ·5 in. long, pubescent, solid part long. Seeds 4, rounded, reniform. *Hab.*

Woods by the river bank, Perak (Scortechini); Ulu Temengoh (Ridley). *Kamuning Gull*

Scortechini's specimen types were very poor, and Clarke's description correspondingly deficient.

(30) ***J. inconspicua* Ridl.** *Journ. Roy. As. Soc. S. Br.* 61, p. 57.

Slender, tall weedy straggling herb, scurfy-pubescent. Leaves very unequal, one lanceolate acuminate acute, base cuneate, æquilateral or nearly, 5 in. long, 1.5 in. across, glabrous except pubescent nerves, small leaf ovate to obovate, 1.25 in. long, .75 in. across or much less; petioles .05 in. long. Cymes axillary, slender, 1 in. long, few-flowered. Sepals linear, setaceous. Corolla .5 in. long, white, lower lip purple. *Hab.* Rare. Pulau Adang Islands, Pulau Rawei (Ridley). Pahang, east coast (Ridley).

J. inconspicua Dayd-Jacks. in *Index Kewensis* is a bare name founded on Wallich No. 2475. No specimen is known to exist, and the plant has never been described.

27. ROSTELLARIA, Nees

Small prostrate herbs, or decumbent. Leaves small. Spikes terminal, cylindric. Bracts linear, as long as sepals. Bracteoles 0. Sepals 4. Corolla short, pink or white spotted pink. Stamens 2; anther-cells one below the other, tailed. Capsule 4-seeded nearly from base. Species 5 or 6, which might be reduced to one.

(1) ***R. procumbens* Nees, Wall. Pl. As. Rar. iii.** 101. *Justicia procumbens* Linn. *Sp. Pl.* 15; Clarke, *l.c.* 688.

Slender decumbent herb usually glabrous. Leaves elliptic or oblong, base narrowed, .5 to 1 in. long, .15 to .2 in. wide; petioles .1 in. long. Spikes hairy. Sepals linear hairy nearly as long as corolla. Corolla .25 in. long, white spotted pink. Capsule .25 in. long. *Hab.* Open sandy spots. Not very common, Negri Sembilan, Tampin. Penang, in coconut estates near town (Curtis). *Distrib.* India, Australia.

28. RUNGIA, Nees

Small weedy plants. Flowers small in peduncled spikes. Bracts usually strobilate, edges white. Bracteoles 2, smaller. Sepals nearly free, linear. Corolla small, blue, pink or white, tube oblong, short. Stamens 2, 1 anther-cell below the other, tailed. Ovules 4. Capsule small. Seeds 2 or 4; placentæ rising up elastically. Habit of *Rostellaria*, but bracteoles 2. Species 35, Africa, India to China.

Spikes long, narrowed lax

Spikes flat, one-sided, short; bracts distichous . . . (1) ***R. minutiflora***

. . . (2) ***R. pectinata***

(1) ***R. minutiflora* Clarke, l.c.** 698.

Weak slender-branched herb, 9 in. tall. Leaves ovate-lanceolate or ovate, thin acuminate shortly blunt, base cuneate, 1.5 to 2 in. long, .75 in. wide; petioles .5 to .75 in. long, slender. Spike

terminal lax, narrow, 1 in. long; peduncle .5 in. long. Bracts elliptic-obtuse green. Corolla .2 in. long. Stamens 2, one anther-cell a little below the other, tailed. Capsule .15 in. long; placentas rising elastically. *Hab.* Lankawi, small islands (Curtis).

(2) **R. pectinata** Nees, *Pl. As. Rar.* iii. 110; *Clarke in Hook. fil. F.B.I.* iv. 550.

A small-branched weed, 6 in. tall. Leaves oblong blunt, base shortly cuneate, 1 in. long, .5 in. or less wide; petioles .2 in. long. Spikes flat, one-sided sessile, terminal and axillary, .25 to .5 in. long. Bracts dimorphous distichous, lanceolate acute mucronate, hairy on the edge, .15 in. long, opposite, one ovate, edged white. Bracteoles narrow. Sepals linear acuminate. Corolla .1 in. long, white with blue lower lip, .25 in. long or less. *Hab.* Open sandy places, Perlis, Kanga (Ridley). *Distrib.* India.

29. RHINACANTHUS, Nees

Erect herb. Flowers in sub-sessile distant clusters on branches of a panicle. Bracts very small, linear. Sepals 5, linear, hairy. Corolla 2-lipped; tube slender cylindric, longer than limb, anticous lip 3-lobed, posticous, narrow-oblong linear curved and curled. Stamens 2, shortly exsert; anther-cells 2, one a little below the other, not tailed. Ovary hairy. Capsule stalk cylindric. Seeds 4, in tip pubescent. Placentæ not elastic. Species 3 or 4, Africa and India.

(1) **R. communis** Nees, *Wall. Pl. As. Rar.* iii. 109.

Two to four ft. tall, rather stiff. Leaves ovate to lanceolate, narrowed at both ends, sub-obtuse, 2 to 4 in. long, 1 to 1.5 in. wide; petioles .35 in. long. Panicles lax axillary, 3 in. long, cymose at end of branches. Calyx .25 in. long. Corolla white, tube .5 in. long; limb .3 in. across. Capsule .7 in. long, hairy. *Hab.* Open places chiefly in the north, Malacca (Griffith). Penang (Deschamps, Curtis). Setul. Perlis, Kanga (Ridley). *Distrib.* Indo-Malaya.

30. PTYSSIGLOTTIS, Anderson

Herbs, usually rather lax, spreading. Panicles lax. Flowers small distant, solitary or in clusters. Corolla 2-lipped, white or yellow. Stamens 2; anther-cells 2, parallel and at equal height, or the lower slightly divaricate, but without tails. Capsule as in *Justicia*. Seeds 2 or 4. Species 12, Indo-Malaya. Panicle open with long branches.

Slender scrambling, rooting plant; panicles cymose;
flowers white

(1) **P. subcordata**

Erect fleshy and shrubby herbs.

Panicle of few-branched, long spikes; flowers yellow.

Leaves obovate, broad, glabrous

(2) **P. obovata**

Leaves lanceolate; panicle pubescent

(3) **P. parviflora**

Panicle dense oblong; leaves lanceolate; flowers
yellow

(4) **P. densiflora**

Panicle of few short thick branches; flowers yellow;	
leaves ovate	(5) <i>P. flava</i>
Leaves lanceolate, 5 in. long; flowers .25 in. long	(6) <i>P. chrysea</i>
Leaves lanceolate, 2 to 3 in. long; flowers 15 in.	
long	(7) <i>P. rubro-lutea</i>
Panicle reduced to 2 or 3 flowers only	(8) <i>P. radicans</i>

(1) *P. subcordata* Moore, *Journ. Bot.* 1922, p. 358. *Leda subcordata* Clarke, *l.c.* 691.

A nearly glabrous herb, 1 to 2 ft. tall, straggling and rooting. Leaves ovate acuminate, blunt, base rounded or slightly cordate, 3.5 in. long, 1.5 in. wide; petioles .25 to 1 in. long. Panicle lax, terminal; branches slender. Flowers in threes, white. Sepals linear. Corolla .5 in. long, tube funnel-shaped. *Hab.* Forests. Perak, Ulu Batang Padang (Kunstler, Scortechini); Temengoh; Kinta (Curtis).

(2) *P. obovata* Moore, *l.c.* 358. *Leda obovata* Clarke, *l.c.* 691.

Herb about 1 ft. tall. Leaves obovate or ovate, shortly acuminate decurrent on the petiole, 5 to 8 in. long, 4 to 5 in. wide; petioles .5 to 1.5 in. long. Panicle of 2 or 3 long, slender branches about 3 in. or more long on a peduncle sometimes 10 in. long. Sepals linear acute. Corolla .5 in. long, yellow, narrow, funnel-shaped, lobes short. Capsule .4 in. long, stalk long, upper part slightly dilate with 2 round seeds. *Hab.* Dense damp forests, Pahang, Telom. Selangor, Ginting Peras (Ridley). Perak (Scortechini).

(3) *P. parviflora* Ridl. *Pseuderanthemum parviflorum* Ridl. *Journ. Linn. Soc.* xli. 294.

A shrubby glabrous plant. Leaves elliptic-lanceolate acuminate at both ends, 7 in. long, 2.25 in. wide; petioles 2 in. long. Panicle spiciform pubescent with one or two long branches at the base. Flowers small in short cymes, .1 in. long with persistent bracts. Pedicels .1 in. long. Sepals linear acuminate. Corolla .35 in. long, base tubular dilate at base of limb, lobes unequal pubescent. Stamens 2; anther-cells slightly superposed, elliptic with 2 minute points (not white tails) at base, backs hairy. Capsule 1.5 in. long, base .75 in. long, cylindric, narrow, head large, abrupt ovate acute, beaked narrowed between the 2 pairs of seeds. *Hab.* Mountain forests, rare. Selangor, Menuang Gasing (Kloss).

(4) *P. densiflora* Ridl. *Leda densiflora* Clarke, *l.c.* 691.

Stems 8 in. long, base decumbent. Leaves lanceolate or elliptic lanceolate, undulate cuneate at base, 5 in. long, 1 to 1.5 in. wide; petioles .25 in. long. Peduncle .5 in. long. Panicle dense, oblong, 2 in. long, 1 in. wide; flowers many; pedicels none to .1 in. long. Sepals .06 in. long, lanceolate, glabrous. Corolla .5 in. long, yellow funnel-shaped, deeply 2-lipped. Stamens anthers parallel at equal heights. Capsule .75 in. long, glabrous, 4-seeded. *Hab.* Dindings, Gunong Tungul (Ridley).

(5) **P. flava** Ridl. *Leda flava* Ridl. *Journ. Roy. As. Soc. S. Br.* 61, p. 36.

Herb about 3 ft. tall. Leaves ovate, shortly acuminate, base narrowed, rather fleshy, silvery; nerves 8 pairs, prominent; 4 in. long, 2 in. wide; petioles .5 in. long. Panicle terminal of 3 to 4 strict branches scurfy. Flowers numerous. Bracts linear acute, .1 in. long. Calyx as long; sepals linear subulate. Corolla yellow, .2 in. long, tube thick. Stamens 2; anther-cells parallel. *Hab.* Rare in swampy woods, Perak, Tapah near Temoh (Ridley).

(6) **P. chrysea** Ridl.

Stem unbranched, woody, creeping ascending, 1 ft. long, erect, part 6 in. long. Leaves rather fleshy lanceolate or elliptic acuminate, base shortly narrowed, glabrous, .5 in. long, 1.75 to 2.25 in. wide; petioles .3 to .4 in. long. Spikes 2, terminal, one-branched, 2.5 in. long, many-flowered. Bracts minute persistent. Calyx dilate at base, lobes lanceolate acuminate. Corolla yellow, .25 in. long, tube straight cylindric, lips .1 in. long; anther-cells parallel oblong on the same level. *Hab.* Mountain woods. Rare. Selangor, Ulu Gombak (Ridley).

(7) **P. rubro-lutea** Ridl.

Slender creeping ascending plant with long internodes 6 in. tall, pubescent. Leaves in equal pairs elliptic-lanceolate, blunt, base narrowed, scurfy pubescent beneath with many raphides, 2 to 3 in. long, .6 to 1 in. wide; petioles slender, .2 in. long. Raceme terminal, 4 in. long. Flowers about 10, solitary or paired, sessile. Sepals linear acuminate, glabrous. Corolla .25 in. long, glabrous, lips equilong, lower broader with short lobes, upper lobe and tube brown red, with two pale stripes, lower yellow. Stamens 2, filaments glabrous; anther-cells ellipsoid, not spurred one above the other. Capsule .5 in. long, base slender, tip clubbed very shortly. Seeds 2. *Hab.* Kelantan, Chaning Woods (Ridley).

(8) **P. radicans** Moore, *Journ. Bot.* 1922, p. 358. *Leda radicans* Clarke, *l.c.* 692.

Creeping and rooting; stems 10 in. long, branched pubescent. Leaves ovate-rhomboid or nearly rounded at base, 1.5 in. long; petioles .25 to .5 in. long. Inflorescence terminal depauperate of 2 to 3 distant flowers. Sepals .125 in. long, linear pubescent. Corolla .5 in. long. Stamens 2; anther-cells nearly at equal height. *Hab.* Rare and little known in forests, Perak, Ulu Selama (Scortechini).

EXCLUDED SPECIES

LEDA ANDROGRAPHIOIDES Clarke, *l.c.* 692. Singapore (Ridley) is *Justicia vasculosa* Wall.

31. POLYTREMA, Clarke

Slender, more or less creeping and ascending herb. Leaves opposite, equal or unequal. Cymes axillary, small, few-flowered.

Calyx and lobes setaceous linear, 5. Corolla fairly large conspicuous, white or rosy, 2-lipped. Stamens 2; anther-cells 2, elliptic one slightly below the other, base blunt or acute, not tailed. Capsule stalked. Seeds 4, pustulate. Species 7, Malay Peninsula and islands.

Leaves in pairs, very unequal.

Leaves entire (1) *P. vulgare*

Leaves crenulate (2) *P. crenulatum*

Leaves equal, plant ascending.

Leaves elliptic, 4·5 in. long; petioles ½ to 1 in. long

(3) *P. isophyllum*

Leaves elliptic-ovate, 2 to 3 in. long; petioles 1 in. long

(4) *P. æquale*

Plant creeping, throwing up 3 in. stems (5) *P. repens*

Plant prostrate; leaves elliptic-ovate, brown (6) *P. cupreum*

(1) *P. vulgare* Clarke, l.c. 693.

Slender shrubby herb, about 1 ft. tall, branched and often decumbent. Leaves very unequal, one elliptic or nearly ovate acuminate, base shortly narrowed, 4 in. long, 1·5 to 2 in. wide, small one ovate, 2·5 to 5 in. long; petioles none to 1 in. long. Cymes few-flowered, sessile, 2·5 in. long. Sepals setaceous, 3·5 in. long. Corolla white, 7 in. long, tube funnel-shaped. Capsule 7 in. long. Seeds 4. *Hab.* Banks in forests. Johor, Gunong Janeng (Kelsall); Pulau Aor (Feilding). Selangor, Kwala Lumpur (Curtis). Perak, Ulu Temengoh; Kwala Kenering; Sungei Siput; Kwala Dipang; Hermitage Hill; Goping (Kunstler). Dindings, Gunong Tungul. Penang Hill and Muka Head (Curtis).

(2) *P. crenulatum* Clarke, l.c. 693.

Branches 6 to 8 in. long, decumbent, much divided. Leaves up to 2·5 by 1 in. long, sub-sessile elliptic acuminate, edge finely crenulate. Cymes closely axillary, 1- to 3-flowered. Sepals 2 in. long, linear setaceous, nearly glabrous. Corolla 3·5 in. long. Otherwise as in *P. vulgare*, possibly only a starved form. *Hab.* Perak (Scortechini).

I have not seen this plant.

(3) *P. isophyllum* Clarke, l.c. 693.

Herb 1 to 2 ft. tall, nearly glabrous. Leaves opposite, equal, yellow when dry, 4·5 in. long, 1·75 in. wide, elliptic-acuminate, base cuneate, covered with rhaphides; nerves 7 to 8 pairs; petioles ½ to 1 in. long. Cymes small, few-flowered, axillary. Sepals 3·5 in. long, setaceous, minutely pubescent. Corolla white, more than 5 in. long. Stamens 2; filaments glabrous; anther-cells rather long, not tailed, distant but not parallel, one for one-third of its length below the other. *Hab.* Perak (Scortechini).

I have not seen this specimen, and should have referred my species *P. æquale* to it except for the statement that the leaf is nearly twice as long and the petioles ½ to 1 in. long.

(4) *P. æquale* Ridl.

Slender, creeping, ascending, wiry herb, branched, glabrous, 1 ft. tall. Leaves opposite, equal elliptic acuminate or ovate acuminate, base narrowed, blunt; nerves 6 pairs; 2 to 3 in. long, 1 to 1.5 in. wide; petioles .1 in. long. Flowers solitary or 2 on a short peduncle .2 in. long or less. Sepals linear-acuminate, glabrous, .25 to .4 in. long. Corolla .5 in. long, white with a yellow patch on the lower lip. Capsule .5 in. long. Seeds 4, flat orbicular pustulate. *Hab.* Forests, Negri Sembilan, Bukit Tangga. Selangor, Batu Caves. Pahang, Gunong Senyum (Evans).

var. *minor*. Whole plant 6 in. tall. Leaves elliptic-lanceolate, 1.5 in. long, .5 in. wide; petioles .3 in. long. Apparently a dwarf form. *Hab.* Rahman, Bukit Besar (Gwynne-Vaughan).

(5) *P. repens* Ridl. *Journ. Roy. As. Soc. S. Br.* 57, p. 86.

Prostrate creeping herb throwing up erect stems 3 in. tall; stems slender pubescent, internodes 2 in. long. Leaves equal, ovate, sub-acute, base round, 1 in. long, .75 in. wide, pale beneath; petioles .75 in. long. Cymes terminal on the branches, 1.5 in. long, pubescent. Bracts linear subulate, .12 in. long, pubescent. Sepals linear acuminate, hairy. Corolla .5 in. long, white, tube trumpet shaped, dilate at base, pubescent. *Hab.* In hill woods, local. Perak, Ulu Temengoh (Ridley).

(6) *P. cupreum* Ridl. *Journ. Roy. As. Soc. S. Br.* 50, p. 124.

Small, creeping plant with elliptic rounded or ovate leaves, equal, brown, glabrous or sub-pubescent beneath, .5 to 1 in. long and as wide; petioles .5 in. long. Flowers 3 or 4 on a short terminal cyme (often cleistogamous). Sepals linear acuminate, pubescent, brown. Corolla .5 in. long, pale rose with a yellow patch on the lower lip; lobes oblong truncate. Anther-cells oblong acute, parallel. Ovary pubescent. Capsule .5 in. long, 4-seeded. *Hab.* Perak, Telok Pinang near Ipoh (Ridley). A rare and pretty plant.

32. SPHINCTACANTHUS, Benth.

Shrubs. Leaves broad, membranous. Flowers small in spikes or spike-like panicles, axillary and pseudo-terminal. Bracts small. Calyx 5-fid nearly or quite to base; lobes subulate acuminate. Corolla-tube thick (or ovoid, tubular constrict at mouth); limb 2-lipped, upper lip erect, 2-lobed, lower as long or slightly longer, 3-lobed. Stamens 2, fixed to the mouth of tube, shorter than upper lobe. Anthers oblong; cells 2, equal, parallel muticous. Style filiform; ovules 2 in a cell. Capsule oblong clavate, base solid, retinacula strong. Seed orbicular coarsely pustulate. Species 4 or 5, India, Cochinchina, Malay Peninsula, China.

(1) *S. malayanus* Ridl. *Journ. Roy. As. Soc. S. Br.* 86, p. 306.

Shrub 2 ft. tall; stems pale fawn-colour. Leaves lanceolate acuminate, glabrous above, sparsely hairy beneath especially on

and near midrib; nerves 8 pairs; 6 to 8 in. long, 1.5 to 2.75 in. wide; petioles .5 in. long. Panicle spike-like, 7 in. long with many short branches from .5 to .75 in. long in fruit, all hairy peduncle 3 to 4 in. long. Flowers white, 2 to 7 on a branch. Bracts very small, lanceolate. Sepals free to base, lanceolate subulate, .08 in. long. Corolla .25 in. long, tube cylindric white, limb short, upper lip oblong, bilobed longer than lower lip, lower lip dentate with purple spot at base. Stamens glabrous included, deep brown purple. Fruit hairy, .25 in. long. Seeds round, flat, strongly pustulate. *Hab.* Hill forests, Negri Sembilan, Bukit Tangga (Ridley).

33. ECBOLIUM, Kurz

Spikes strobilate with broad imbricate bracts. Corolla-tube narrow cylindric, long; lobes broad. Stamens 2; anther-cells 2, at equal height, muticous. Capsule stalked. Seeds large, flat in the round head. Species 12, African and Indian.

(1) *E. Linneanum* Kurz, *Journ. As. Soc. Beng.* xl. (2), p. 75; *Clarke, l.c.* 694.

Shrub. Leaves elliptic or obovate acute, 3 to 6 in. long, 1.5 to 2 in. wide; petioles short. Spikes 2 to 6 in. long. Bracts .5 in. long, broad, green blunt or rounded. Calyx-lobes .2 in. long. Corolla greenish blue, tube .75 to 1 in. long; limb 1 in. across. Capsule .75 in. long; head round, flat, .3 in. across with 2 large, flat seeds. *Hab.* Waste places near gardens, Penang and Malacca (Kunstler and Maingay).

I have never seen this plant in the Malay Peninsula, and I think the specimens recorded above must have been aliens from gardens. It is an African and Indian species.

34. DICLIPTERA, Juss.

Diffuse erect herbs. Leaves ovate acute. Inflorescence in axillary cymes forming a terminal spike. Bracts larger than calyx. Flowers sessile. Bracteoles linear. Calyx 5-lobed, lobes linear-lanceolate. Corolla pink or red, spotted purple, tube slender, limb deeply 2-lipped. Stamens 2; anthers 2-celled, cells ovoid muticous. Capsule clavate, stalk solid, placenta rising elastically. Species about 60, tropics generally.

(1) *D. rosea* Ridl. *Journ. Roy. As. Soc. S. Br.* 59, p. 154.

About 1 ft. tall, stem 4-angled, glabrous. Leaves lanceolate or ovate, base cuneate, tip short, blunt acuminate; nerves hairy beneath only; 1.5 to 3 in. long, 1 to 1.75 in. wide. Terminal spike of cymes about 3 in. long. Bracts ovate cuspidate nearly sessile, .25 in. long, green hairy, edge ciliate. Flowers pink. Corolla-tube .25 in. long, lobes linear as long. Fruit .12 in. long, narrow hairy on back. Seeds flat, elliptic, edge pustular. *Hab.* On limestone rocks in north. Kedah, Gunong Geriang. Perlis, Bukit Lagi, Kanga (Ridley).

35. PERISTROPHE, Nees

Erect herbs. Leaves equal. Flowers 1 to 4 together between 2 leafy bracts axillary or terminal clustered. Calyx-lobes lanceolate. Corolla bright or pale mauve, tube long, slender, limb conspicuously 2-lipped, upper entire, lower broad, elliptic, shortly 3-lobed at tip. Stamens 2; anther-cells 2, muticous, one-half its length above the other. Capsule ellipsoid pubescent, placentæ not elastic. Species about 20, Africa, tropical Asia to Japan.

Flowers in dense heads.

Leaves broad ovate; bracts ovate large	(1) <i>P. tinctoria</i>
Leaves narrow; bracts narrow linear or lanceolate	(2) <i>P. acuminata</i>
Flowers lax paniced	(3) <i>P. bicalyculata</i>

(1) *P. tinctoria* Nees, *Wall. Pl. As. Rar.* iii. 113; *Clarke, l.c.* 695.

Herb 3 to 4 ft. tall. Leaves ovate-elliptic, short acuminate, base cuneate pubescent or glabrate; nerves prominent; 2.25 to 3 in. long, 1.75 in wide; petioles .5 to 1 in. long. Peduncles at branch ends, 1 in. long, pubescent. Bracts ovate acute, .75 to 1 in. long, .2 to .5 in. wide. Sepals lanceolate hairy. Corolla showy, 1.5 in. long, tube white, lobes bright mauve with a cream-coloured horse-shoe in the mouth. Capsule .6 in. long. *Hab.* Shady spots usually near cultivation and probably introduced. Singapore, Changi (Hullett); Tanglin. Johor, Tanjong Kupang. Province Wellesley at Krian (Scortechini). Adang group, Pulau Tengah (Ridley). *Distrib.* Indo-Malaya. *Native name*: Noja. *Use*: The flowers are used to stain eggs at feasts.

(2) *P. acuminata* Nees, *Wall. Pl. As. Rar.* iii. 113; *Clarke, l.c.* 696. *P. salicifolia* Miq. *Fl. Ind. Bat.* ii. 847.

A glabrous, weedy plant about 3 ft. tall with distant nodes. Leaves lanceolate acuminate, base narrowed, 3 in. long, .5 in. wide; nerves fine inconspicuous; petioles slender, .5 in. long. Cymes short, about .5 in. long, very shortly peduncled. Bracts linear, .5 in. long, .06 to .09 in. wide. Corolla .5 in. long, tube and back of lobes white, upper sides of lobes light rosy mauve with a cream-coloured blotch and 8 purple spots in the mouth, whole limb .25 in. wide. Capsule .4 in. long. *Hab.* Common in waste ground and road-sides, Singapore, Tanglin; Chua Chu Kang. Johor. Pulau Tiunan. Pahang, Pekan. Malacca, Ayer Panas (Derry). Selangor, Rantau Panjang; Raub track (Machado); Ulu Gombak. Perak, Tanjong Malim. Penang, Balik Pulau Road (Curtis). Kedah, Alor Sta. Kelantan, Kota Bharu.

var. *salicifolia* *P. salicifolia* Miq. *Fl. Ind. Bat.* ii. 847; *Clarke, l.c.* 696. A more robust form with broader leaves and bracts. *Hab.* Penang Hill and Balik Pulau. Perak (Scortechini). *Distrib.* Burma and Malay Archipelago. *Native name*: Rumput Lida Jin.

Fl. M.P., 2.

R R

(3) **P. bicalyculata** Nees, *Wall. Pl. As. Rar.* iii. 113; *Clarke, in Hook. fil. F.B.I.* iv. 554.

About 2 ft. tall, wiry, thinly hairy. Leaves ovate acuminate, 2 in. long, 1 in. wide; petioles .25 in. long. Panicle lax, spreading with axillary lax cymes; branches slender, ending in a single flower with a narrow spatulate linear bract, .24 in. long. Calyx-lobes shorter, narrow. Corolla .5 in. long, pale pink. Capsule ellipsoid, .5 in. long. *Hab.* Setul, open sandy heaths (Ridley). *Distrib.* India.

36. HYPOESTES, R. Br.

Erect branched herbs or shrubs. Leaves sub-equal. Flowers paired. Bracts 2, connate into an obconic or cylindric involucre; bracteoles usually longer than calyx. Involucre enclosing heads of flowers. Calyx deeply lobed, lobes lanceolate. Corolla pale pink (or purple), tube narrow, cylindric, lips 2, narrow. Stamens 2; anther-cell 1, muticous. Capsule oblong or ellipsoid, 4-seeded; placenta not rising elastically. Species 40, Africa and Indo-Malaya.

(1) **H. malaccensis** Wight, *Ic.* 1555; *Clarke, l.c.* 697.

About 1 ft. tall, pubescent. Leaves elliptic-lanceolate, narrowed both ends, 3 in. long, .8 in. wide or less; petioles .5 in. long. Clusters of involucre 1 in. long. Calyx .25 in. long. Corolla very slender, .75 in. long. Stamens long exsert. *Hab.* Waste ground, very local. Malacca by the old chapel (Griffith, Maingay and Ridley). *Distrib.* Malay isles.

EXCLUDED SPECIES

CARDANTHERA TRIFLORA Wight, Singapore (*vide* Clarke). No specimen seen. A native of India.

ADHATODA VASICA Nees. Penang (Curtis), Singapore (*vide* Hooker). There was formerly a bush of this in a garden in Penang, but it is not wild nor does it thrive except in very dry spots.

CYSTACANTHUS TURGIDA Nicholson, Penang (Deschamps). A Cochinchinese plant often cultivated in gardens, not wild here.

GRAPTOPHYLLUM HORTENSE Nees. The Caricature plant, is cultivated only in all gardens. The leaves are green variegated with red or yellow in cultivation, but plants abandoned in jungle on Bukit Timah lost all variegation and became dark green only. The species is given from Perak and Kedah (Scortechini and Kunstler) by Clarke, but doubtless from garden-plants.

ORDER CVII. VERBENACEÆ.

Shrubs, trees or herbs. Leaves opposite or whorled (falsely alternate in *Geunsia*), simple, digitate or pinnate (*Peronema*). Inflorescence cymose, paniced, racemose or spicate. Flowers bisexual generally distinctly irregular, of all colours. Calyx gamosepalous, inferior. Corolla gamopetalous, limb 2-lipped or of 5 or 4 equal lobes. Stamens 4 in 2 pairs, or 2, rarely more, insert on corolla-tube; anthers 2-celled. Ovary superior, 2- to 4-celled, often 4-lobed; ovules 2 or 1 in a cell; style usually long; stigma entire or bifid. Fruit a drupe, pyrenes bony, or capsular, 1- to 4-celled. About 800, chiefly tropical, rare in temperate regions (Gamble, *Journ. As. Soc. Beng.* lxxiv. (2), p. 794).

i. VERBENÆ. Herbs or shrubs. Inflorescence spicate or sub-umbellate, lower flowers opening first.

Shrubs; spikes short sub-umbellate. Drupe

pulpy; stamens 4

1. LANTANA

Herbs creeping; spikes short; drupe dry;

stamens 4

2. LIPPIA

Shrubby; spikes elongate; stamens 2; fruit dry.

3. STACHYTARPHETA

ii. VITICLÆ. Trees or shrubs. Inflorescence cymose, end flowers opening first.

Leaves simple.

Corolla regular.

Tree; flowers 5-merous; pyrenes 5 to 10

4. GEUNZIA

Trees or shrubs; flowers 4-merous; pyrenes 4

5. CALICARPA

Corolla 2-lipped.

Flowers small, white; pyrenes 1

6. PREMNA

Flowers large, yellow; corolla swollen at top

7. GMELINA

Flowers showy, tube cylindric or dilate upwards

8. CLERODENDRON

Leaves digitate (rarely 1-foliate); corolla-tube short

9. VITEX

iii. CARYOPTERIDÆ. Fruit capsular.

Tree; leaves pinnate; fruit small, not winged

10. PERONEMA

Shrub scandent; leaves entire; capsule 4-valved

11. GLOSSOCARYA

Climbers; leaves 3- or 5-foliate; fruit winged by developed sepals

12. PETRÆOVITEX

iv. Cymes capitate surrounded by a large involucre. Climbers.

Involucral bracts 6; corolla-lobes sub-equal

13. SPHENODESME

Involucral bracts 4; corolla-lobes unequal

14. CONGEA

v. AVICENNÆ. Tidal shrubs or trees; leaves entire; cymes capitate.

Flowers small, yellow; fruit ovoid, beaked or globose

15. AVICENNIA

1. LANTANA, Linn.

Erect or sub-scandent, rough, often prickly shrubs. Leaves rough crenate. Flowers in dense umbel-like racemes or heads, axillary. Bracts conspicuous. Calyx campanulate, 4- to 5-toothed. Corolla salver-shaped; tube slender cylindric; lobes spreading or orbicular, purple, yellow, red or white. Stamens 4.

Ovary 2-celled. Drupe small, pulpy, black, with two 1-seeded pyrenes. Species 50, mostly American, a few Asiatic and African.

Unarmed shrublet erect; flowers lilac (1) *L. indica*

Armed; flowers yellow turning red or pink, sarmentose bush (2) *L. aculeata*

(1) *L. indica* Roxb. *Hort. Beng.* 46; *Fl. Ind.* iii. 89. *L. salviaefolia* Gamble, *l.c.* (not of Jacquin).

Erect little-branched shrub about 2 ft. tall; 4-angled hispid stems. Leaves opposite or whorled, ovate-lanceolate acute, base suddenly decurrent, crenate serrate, 2 to 3 in. long, 1 in. wide; petioles .2 in. long. Spikes globose, at length oblong, .5 to 1 in. long. Flowers lilac. Drupe sub-globose, purple black. *Hab.* Open waste ground, almost certainly introduced, Singapore, Alexandra Road; Sepoy lines. Malacca, Pengkalan Minyak (Cantley); in Malacca town. Perak, Telok Anson. Penang, Balik Pulau (Curtis). *Distrib.* Indo-Malaya. *Native name:* Bunga Pagar Putih.

(2) *L. aculeata* Linn. *Sp. Pl.* 627; Gamble, *l.c.* 796. *L. camara* Linn. *l.c.*

Straggling prickly strong-smelling bush, 4 to 8 ft. tall. Leaves ovate acute, base cordate decurrent, crenate pubescent beneath, 1 to 3 in. long, 1 to 2 in. wide; petioles .5 in. long. Heads umbellate, 1 in. across; peduncles 1 in. long, hairy. Flowers usually yellow turning red or pink with a yellow eye. Drupe sub-globose, black. *Hab.* Open country, formerly very abundant in Singapore and Malacca covering considerable areas, but less abundant nowadays. Whole peninsula. Introduced from South America. *Native name:* Bunga Tahi Ayam.

2. LIPPIA, Linn.

Herbs (or shrubs) more or less hairy. Leaves opposite (or whorled) serrate (or entire). Flowers in globose elongating to cylindric heads. Calyx 2- to 4-lobed. Corolla salver-shaped, limb more or less 2-lipped. Stamens 4; style short. Stigma capitate. Fruit dry of 2 bony pyrenes. Species about 100, chiefly tropical American.

(1) *L. nodiflora* Mich. *Fl. Bor. Am.* ii, 15; Gamble, *l.c.* 797.

A creeping herb; stems prostrate, rooting, slender, 1 ft. long. Leaves spatulate, tip round, serrate, .75 to 1 in. long, .25 in. wide, hairy or nearly glabrous. Spikes globose, .25 in. long, lengthening to cylindric oblong .5 in. long; peduncles 1 to 2 in. long, axillary. Calyx 2-lobed, lobes lanceolate pubescent. Corolla .1 in. long, pinkish white. Fruit .07 in. long. *Hab.* Waste ground, occasional, Singapore, waste ground in Rochore; Alexandra Road. Selangor, Salak, South Road (Seimund). Province Wellesley, Prai Dock (Curtis). Penang, Sungei Penang (Curtis). Patalung, sand near sea (Annandale). *Distrib.* Tropics and sub-tropics of whole world.

3. STACHYTARPHETA, Vahl.

Low shrubby plants. Leaves toothed. Flowers in tall slender axillary spikes, in axils of bracts; rachis hollowed for each flower, blue or rose, opening a few at a time. Calyx elongate cylindric, 4- to 5-toothed. Corolla salver-shaped, tube cylindric, limb 5-lobed. Stamens 2, enclosed. Staminodes 2 or 0. Ovary 2-celled; ovules solitary; style long exsert. Stigma capitate. Fruit cylindric of 2 bony 1-seeded pyrenes. Species 40, nearly all South American, a few African.

Low shrubs 1 to 3 ft. tall, glabrous.

Leaves spatulate serrate in upper part; flowers light blue

Leaves oval serrate to base; flowers deep blue
Shrub 6 ft. tall, tomentose; flowers large, rose pink

(1) *S. indica*

(2) *S. jamaicensis*

(3) *S. mutabilis*

(1) *S. indica* Vahl. *Enum.* i, 206.

Low-branched shrublet, about 1 to 2 ft. tall, glabrous. Leaves spatulate, serrate in the upper part, 1.5 in. long, 1 in. wide; petioles .25 in. long, winged to near base. Spikes slender, 6 to 8 in. long. Bracts lanceolate cuspidate. Flowers pale blue. Corolla .5 in. long, lobes round. *Hab.* Common especially on the sea shores and under coconuts. Confused with *S. jamaicensis*, a bigger plant with deep blue flowers, by most botanists. Singapore, Changi. Malacca (Cuming); Merlimau (Cantley). Selangor, Rantau Panjang (Kloss); Kwala Lumpur. Setul. Kelantan river-mouth, sandhills (Ridley). *Distrib.* Indo-Malaya.

(2) *S. jamaicensis* Vahl, *Enum.* i. 206.

Stout, shrubby plant about 3 ft. tall. Leaves oval, serrate to base, decurrent on petiole, 3 in. long, 2 in. wide; petioles 1 in. long. Spikes elongating to 1 ft. long, rather stout, glabrous. Corolla deep blue. *Hab.* Waste ground, often cultivated as a low hedge, Singapore. The whole plant stouter than the last, leaves rather larger and thicker, deep green. Flowers deep, not pale, blue. *Distrib.* South America. *Native name:* Selasih Dindi.

(3) *S. mutabilis* Vahl, *Enum.* i. 209; *Gamble, l.c.* 799.

A stout, woody plant 8 ft. tall, softly tomentose all over with very long 18 in. or more spikes of rose pink flowers over 1 in. long, has occurred as a throwout from gardens in Singapore and Penang, but does not seem to establish itself. A native of tropical America, occurring sporadically as an alien in Asia and Africa.

4. GEUNSLIA, Bl.

Trees (or shrubs) stellate-tomentose. Leaves large entire. Flowers small, numerous in peduncled cymes in upper axils. Calyx campanulate, 5- to 6-toothed. Corolla campanulate, funnel-shaped, lobes 5. Stamens 5 to 6; anthers exsert. Ovary 5 (rarely 4- to

3)-celled; ovules 2 in a cell. Drupe small, globose; pyrenes 5 to 10. Species 3 to 4, Malay Peninsula and Archipelago.

(1) *G. farinosa* *Bl. Bijdr.* 819; *Gamble, l.c.* 800.

A handsome tree about 60 ft. tall, wide-branched, branches covered with stellate mealy tomentum. Leaves coriaceous ovate or elliptic cuspidate, base round or shortly narrowed, mealy tomentose above when young and always beneath, 5 to 9 in. long, 3 to 4 in. wide; petioles 1 in. long. Cymes 1.5 to 3 in. across. Flowers crowded, many; peduncles 1.5 in. long, mealy. Calyx cup-shaped, mealy. Corolla .15 in. long, violet, glabrous, lobes recurved. Stamens long slender, projecting. Drupe .05 in. long, black. *Hab.* Open country and edges of woods, common, Singapore (Wallich). Pahang, Kwala Lipis (Machado); Kwala Tembeling. Selangor, Batu Tiga; Rawang; Rantau Panjang (Kloss); Ginting Bidai. Perak, Ulu Kerling (Kunstler). Lankawi (Curtis). *Distrib.* Siam, Java to Philippines. *Native names*: Poko Amban; Tampang Besih.

5. *CALLICARPA*, Linn.

Trees or shrubs more or less tomentose. Leaves crenate or dentate, rarely entire. Flowers small in large axillary paniced cymes, numerous, violet or greenish. Bracts inconspicuous. Calyx campanulate, truncate or minutely lobed. Corolla campanulate or tubular, lobes 4, oblong. Stamens 4. Ovary imperfectly 2-celled, cells 2-ovuled; style long; stigma dilate, obscurely bifid. Drupe small, globose, purple, black or white; pyrenes 4 or fewer. Species 30, tropical and sub-tropical Asia, Australasia, America.

Trees.

- | | |
|---|--------------------------|
| Leaves densely tomentose beneath; flowers violet . | (1) <i>C. arborea</i> |
| Leaves thinly tomentose beneath; flowers greenish . | (2) <i>C. Maingayi</i> |
| Leaves white beneath with brown scurfy veins . | (3) <i>C. furfuracea</i> |

Shrubs.

- | | |
|---|----------------------------|
| Leaves narrow lanceolate, long acuminate at both ends, grey white beneath . | (4) <i>C. angustifolia</i> |
| Leaves ovate to broad lanceolate, base cuneate, grey tomentose beneath . | (5) <i>C. cana</i> |
| Leaves ovate-lanceolate, base cuneate, scurfy beneath . | (6) <i>C. longifolia</i> |

(1) *C. arborea* *Roxb. Hort. Beng.* 10; *Gamble, l.c.* 803. (Fig. 128, p. 615.)

Tree 40 to 60 ft. tall; stem stout; branches mealy tomentose. Leaves coriaceous ovate or elliptic-lanceolate acuminate, base narrowed, glabrous above when adult except midrib, tomentose beneath, 6 to 12 in. long, 2 to 5 in. wide; nerves strongly raised beneath, nervules transverse; petioles 1 to 2.5 in. long. Cymes many-flowered compound, 3 in. across; peduncle stout, 2 in. long, all tomentose. Calyx mealy funnel-shaped with 4 small teeth. Corolla .06 in. long, violet, glabrous, lobes 4. Stamens long exsert; anthers short oblong. *Hab.* Woods in low country, not rare.

Negri Sembilan, Kwala Pedas; Bukit Tumiang (Cantley). Pahang, Kwala Lipis. Dindings, Bruas. Perak, Blanda Mabok (Wray). Kedah, Yan. Penang, Tanjong Bunga (Curtis). Kelantan, Kota Bharu. *Distrib.* India, Burma, Sumatra. *Native names*: Kata Kran; Ambong Ambong Bukit.

var. *villosa* Gamble has ovate leaves with a broad base. *Hab.* Perak (Scortechini).

(2) **C. Maingayi** King and Gamble, *Kew Bulletin*, 1908, p. 106; Gamble, *l.c.* 804.

Tree, medium size; branches, inflorescence, underside of leaves covered with a yellowish scaly scurf. Leaves thinly coriaceous obovate or elliptic round or shortly acute at tip, narrowed at base;

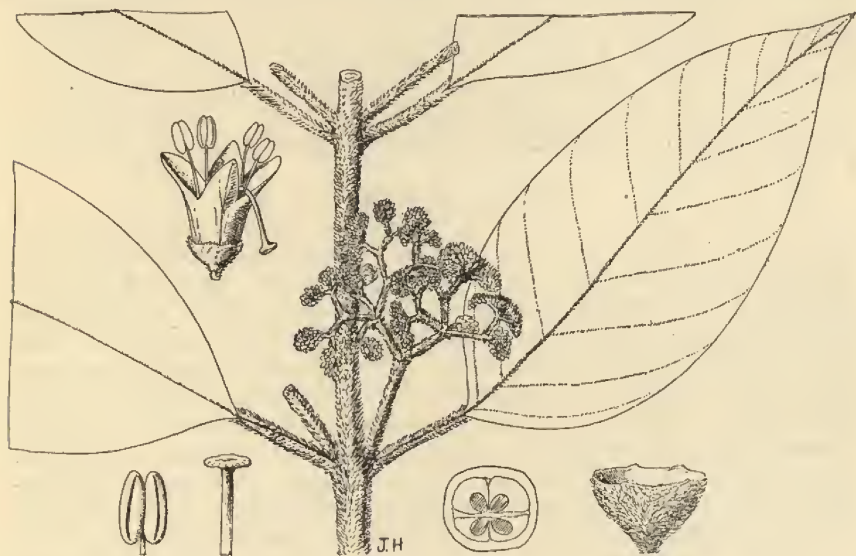


FIG. 128.—*Callicarpa arborea*

nerves strongly elevate; 6 to 12 in. long, 3 to 6 in. wide; petioles 1.5 to 2 in. long. Cymes many-flowered, compound, 2 to 3 in. long and as wide; peduncle short, flattened. Calyx hemispheric, .05 in. long, teeth 4, minute. Corolla .05 in. long, scurfy greenish yellow. Drupe globose, black. *Hab.* Forests; Pahang, river banks. Malacca (Maingay); Hulu Chembong (Derry); Selandor (Cantley). Selangor, Sempang Track, Semangkok Pass; Ulu Gombak Road; Langat. *Native names*: Poko Chulak; Tuto putih. *Use*: Wood for making fiddles.

(3) **C. furfuracea** Ridl.

Branches brown-scurfy. Leaves membranous oblong acuminate, dentate, base truncate; nerves 7 pairs with reticulations conspicuous beneath, above smooth, nerves sunk, midrib scurfy,

beneath pale whitish, nerves, nervules and reticulations brown scurfy; 5 in. long, 2.75 in. wide; petioles .5 in. long. Cymes paniculate terminal, 1 in. or more long, many-flowered, brown scurfy; pedicels .05 in. long with calyx and corolla white-tomentose. Calyx cup-shaped, entire. Corolla .1 in. long, regular, lobes 4, short ovate, blunt, much shorter than the tube. Stamens 4, filaments from corolla base shorter than the corolla-tube. *Hab.* Pahang, Gunong Senyum (Evans).

(4) *C. angustifolia* King and Gamble, *Kew Bulletin*, 1908, p. 106; *Journ. As. Soc. Beng.*, l.c. 804.

A slender, twiggy shrub, grey tomentose. Leaves sub-coriaceous lanceolate, long-acuminate both ends, glabrous above, grey white beneath, 4 to 7 in. long, .75 to 1.5 in. wide; nerves slender elevate; petioles 1 in. long, channelled. Cymes .5 in. long, few-flowered, sessile in axils. Calyx campanulate, stellate tomentose, teeth very short. Corolla .15 in. long, violet pink. Drupe globose, .1 in. through, black. *Hab.* Limestone rocks. Selangor, Batu Caves (Ridley). Perak, Ipoh (Curtis); Batu Kurau (Scortechini). Lankawi (Curtis).

(5) *C. cana* Linn. *Mant.* 198; *Gamble*, l.c. 806.

A shrub about 4 ft. tall; branches, leaves beneath and inflorescence whitish grey tomentose. Leaves membranous, ovate to lanceolate, short-acuminate, base cuneate, serrulate, 4 to 7 in. long, 2 to 3 in. wide; petioles .25 to .75 in. long. Cymes .75 in. long with a very short peduncle (about .25 in. long) about 1 in. across. Flowers numerous. Calyx tomentose. Corolla campanulate, nearly glabrous, lilac, .07 in. long. Drupe globose purple. *Hab.* Open country, edges of woods and clearings. Pahang, Temerloh. Malacca Hill (Derry); Chabau Village (Griffith). Negri Sembilan, Port Dickson. Perak, Thaiping. Province Wellesley, Nibong Tebal. Penang (Wallich, Philipps). Perlis, Tebing Tinggi, Kanga. *Distrib.* Malay islands to Australia.

(6) *C. longifolia* Lam. *Dict.* i. 653; *Ill. t.* 69; *Gamble*, l.c. 807.

Shrub about 4 to 6 ft. tall, sparingly scurfy, not grey white. Leaves membranous, lanceolate or ovate-lanceolate, long acuminate, base narrowed, nearly glabrous above, beneath usually scurfy or sparsely stellate-hairy, serrulate except at base, 3 to 7 in. long, 1.5 to 3 in. wide; petioles lengthening to 1 in. long. Cymes 1 in. or more long; peduncles short, spreading, about 3 in. across in fruit. Calyx campanulate with 4 small teeth. Corolla lilac, rarely rose pink, .1 in. long. Drupe .05 in. through, white. *Hab.* Common in hedges, in low country, Singapore, Tanglin; Bukit Timah; Changi. Johor, Pulau Dayong (Feilding); Pinerong (Cantley). Pahang, Pekan. Malacca, Kesang Batu (Hervey); Jasin (Maingay). Selangor, Batu Caves; Rantau Panjong (Kloss). Perak (Scortechini, Kunstler). Dindings. Tomoh (Machado).

Kelantan, Kwala Lebir (Gimlette). Penang (Curtis, Philipps). Lankawi (Curtis). *Distrib.* Java, Borneo, Sumatra to North Australia. *Native names*: Koping Besih; Karat Besih; Tulang Besih. *Use*: A decoction drunk for colic.

EXCLUDED SPECIES

C. REEVESII Wall. *Cat.* 1830; *Gamble, l.c.* 805, Singapore. A single plant in the Botanic Gardens. Native of China.

C. PEDUNCULATA Br. *Gamble, l.c.* 807, Penang (Wallich, 1834, no. 2). Hamilton, 1834, is from Penang and is *C. cana*. There is no evidence for *C. pedunculata* occurring in the peninsula.

TECTONA GRANDIS Linn. "Burma to Malacca," *Clarke, in Hook. fil. F.B.I.* iv. 570; *Gamble, l.c.* 810. The Teak tree does not occur in the Malay peninsula. In early days of forestry many attempts were made to introduce this tree into our forests, but they invariably failed. Two trees or more in the Botanic Gardens attained a fair height and flowered and fruited, but most of the introduced plants soon perished.

6. PREMNA, Linn.

Shrubs often climbing, rarely trees. Leaves opposite, often crenate, strongly and peculiarly scented when crushed. Flowers very small, white or green in terminal corymbs, rarely panicles. Bracts usually small. Calyx campanulate or tubular, 2-lipped or truncate or with 2 to 5 small teeth. Corolla small, tube short campanulate or funnel-shaped, usually white villous inside, limb 2-lipped, 5-lobed or sub-equally 4-lobed. Stamens 4, usually exsert in corolla throat; anthers ovate or round, parallel or divaricate. Ovary 2- to 4-celled; ovules 4; style slender; stigma bifid. Drupe small globose or obovoid, black, rarely white pulpy. Pyrenes 4-celled or 1- to 3-celled. Seed usually 1, oblong. Species about 40, Old World tropics.

Calyx distinctly 2-lipped, upper lip 3-lobed, lower 2-lobed.

Leaves crenate-dentate (1) *P. littoralis*

Leaves entire (2) *P. rubens*

Calyx upper lip 2-lobed.

Inflorescence of interrupted spikes; leaves subsessile (3) *P. Derryana*

Inflorescence a corymb; leaves petioled.

Low sea-shore shrub, often creeping; corymbs 4 in. wide (4) *P. integrifolia*

Bushy, stems white; corymbs under 2 in. wide; leaves lanceolate (5) *P. angusticr*

Corymbs up to 5 in. across, lax.

Shrub erect; nerves 6 to 8 pairs (6) *P. foetida*

Climbing shrubs; nerves 5 to 6 pairs.

Leaves ovate or elliptic, membranous, chartaceous (7) *P. divaricata*

- Leaves oblong-obovate, adult sub-coriaceous (8) ***P. trichostoma***
 Leaves elliptic to lanceolate, coriaceous
 chartaceous (9) ***P. perakensis***
 Leaves broadly elliptic, rigid; nerves 4 to 5
 pairs; flowers larger (10) ***P. punctulata***
 Corymbs dense.
 Erect shrub. Leaves membranous ovate
 acuminate, base broad (11) ***P. cordifolia***
 Climber. Leaves stiff coriaceous, 4 to 5 in.
 across (12) ***P. Wrayi***
 Climber. Leaves large membranous; corymbs
 8 in. across (13) ***P. sterculifolia***
 Climber. Lower lip of calyx 2-lobed; calyx
 sub-quadrangular; leaves oblong, blunt
 sub-coriaceous (14) ***P. Ridleyi***
 Calyx not 2-lipped truncate or hardly lobed; leaves
 coriaceous; robust shrub (15) ***P. Kunstleri***
 Calyx sub-equally 5-lobed; leaves large, stellate
 tomentose tree (16) ***P. pyramidata***

(1) ***P. littoralis*** King and Gamble, *Kew Bulletin*, 1908, p. 107; *Gamble, Journ. As. Soc. Beng., l.c.* 811.

Small tree; branchlets tawny pubescent. Leaves chartaceous coriaceous, ovate or ovate-deltoid acuminate, base cordate or truncate, edge denticulate, midrib and nerves elevate beneath, 4 to 6 in. long, 2 to 3 in. wide; petioles 1 to 1.5 in. long, puberulous. Corymbs trichotomous pubescent, 4 in. long, 6 in. wide. Flowers very pale green. Calyx .075 to 1 in. long, 2-lipped, upper shortly 3-lobed, lower longer, 2-lobed pubescent. Corolla half as long again, villous hairy inside. Drupe black, globose. *Hab.* Sea-coasts, rare. Perak, Matang (Wray).

(2) ***P. rubens*** Ridl. *P. flavescens* var. *rubens* Clarke in Hook. *fil. F.B.I.* iv. 578; *Gamble, l.c.* 812.

A pubescent climber. Leaves chartaceous, ovate-oblong acuminate, base cordate round or cuneate, above minutely densely bristly, beneath pubescent, 4 to 6 in. long, 2 to 2.5 in. wide; petioles 1 to 1.5 in. long. Corymbs 4 in. long and wide, pubescent. Calyx campanulate, 2-lipped, pubescent. Corolla pale green, funnel-shaped, .1 to .15 in. long, 2-lipped. Drupe .15 in. long, globose. *Hab.* Malacca (Hervey); Ayer Panas (Griffith). Rare.

This is very distinct, I think, from the true *P. flavescens* Ham., nor do I think the much more glabrous, larger-flowered *P. lucidula* Miq. of Java is the same as the Malacca plant to which Gamble refers it.

(3) ***P. Derryana*** King and Gamble, *Kew Bulletin*, 1908, p. 107; *Gamble, l.c.* 813.

Climber. Leaves membranous sub-sessile obovate or elliptic, glabrous entire, shortly, abruptly acute, base narrowed blunt, 5 to 8 in. long, 3.5 to 4 in. wide. Inflorescence of 3 or 4 spikes, 3 to 4 in. long of interrupted whorls of sessile flowers, on a peduncle 2 in. long. Calyx 2-lipped, lips nearly entire rounded, golden-hairy. Corolla rather longer, glabrous except for a few white

hairs in the throat, 2-lipped. Stamens long exsert. *Hab.* Perak, Taiping Hills (Derry and Curtis). Rare.

(4) *P. integrifolia* Linn. *Mant.* ii. 252; *Gamble, l.c.* 813.

Low sea-shore shrub. Leaves chartaceous, oblong-ovate blunt entire (or obscurely crenate), base rounded, 1 to 3 in. long, .5 to 2 in. wide; petioles .5 in. long or less, glabrous. Corymb glabrous, 3 in. long, 4 in. wide (or less). Calyx 2-lipped, upper lip with 2 triangular lobes, lower 2- or 3-toothed. Corolla .1 in. long, tube thick cylindric, short, 2-lipped. Stamens short exsert. Drupe small obovoid. *Hab.* Creeping in sand by the sea, local, Singapore, Serangoon; Changi Loyang; Chan Chu Kang. Malacca, Pulau Besar (Maingay); Kundur (Griffith). Province Wellesley, Batu Kawan.

var. *minor* Ridl., a prostrate creeper; leaves 1 in. long. *Hab.* Pahang, Pekan; on sand-hills. *Distrib.* Mergui, Ceylon.

I am doubtful if Rumphius' *Gumira litorea* is this, as he describes it as a tree, but I think Burman's *Cornutia corymbosa* of Ceylon is intended for this plant—though the Ceylon forms differ somewhat from ours—which is not often even a moderately tall shrub, and never a tree. *P. serratifolia* Linn. and *P. spinosa* Roxb., given as synonyms by Gamble, are quite different plants.

(5) *P. angustior* Ridl. *P. integrifolia* var. *angustior* Clarke in *Hook. fil. F.B.I.* iv. 574.

A low, much-branched shrub, with white bark. Leaves fleshy lanceolate blunt or oblong, base blunt, 2 in. long, .5 in. wide; petioles .5 in. long. Corymbs 1.5 in. long, 1 in. wide, puberulous. Calyx campanulate toothed. Corolla as in *integrifolia*, greenish. *Hab.* Rare, Malacca, Pulau Jawa on upper limits of mangroves, a low much-branched shrub (Griffith).

I think this plant is distinct from *P. integrifolia* Linn., but more specimens are required.

(6) *P. foetida* Reinw. *Bl. Bijdr.* 816; *Gamble, l.c.* 814.

Large shrub to about 20 ft. tall, bark white; young branches, petioles and nerves hairy. Leaves chartaceous ovate, short-acuminate, base round, occasionally slightly cordate, 3 to 6 in. long, 2 to 3 in. across; petioles 2.5 in. long. Corymbs 3 to 5 in. long and wide, sub-sessile lax hairy. Calyx cup-shaped, 2-lipped, upper lip 2-lobed, lower shortly 3-lobed. Corolla greenish white hardly 2-lipped, .1 in. long, densely villous in mouth. Stamens short exsert. Drupe black, globose. *Hab.* Damp low-lying ground, Singapore, Tanglin, common, Johor, Batu Pahat; Kukub. Malacca, Pulau Nangka; Pulau Dodol (Cantley). Perak, Matang (Wray). Kedah, Alor Sta (smaller form with cordate, slightly crenate leaves). Perlis, Kanga (Ridley). *Distrib.* Java, Borneo. *Native name:* Buas-Buas. *Use:* Leaves as a pot-herb.

(7) *P. divaricata* Wall. *Cat.* 1781; *Gamble, l.c.* 815.

Climbing shrub; young parts hairy. Leaves chartaceous;

nerves 5 to 6 pairs, ovate or elliptic, base round or sub-cordate; 3 to 5 in. long, 2 to 3.5 in. wide; petioles .5 to 1 in. long. Corymbs divaricate, pubescent, 5 in. long and wide; peduncles 1 to 2 in. long. Calyx prominently 2-lipped, upper lip much the longer, with 2 long lobes. Corolla cylindric, .075 in. long, white-villous inside, puberulous outside. *Hab.* Open country in thickets. Common, Singapore, Racecourse (Hullett); Economic Gardens; Jurong. Johor, Castlewood; Pulau Dayong (Feilding). Malacca, Chabau (Hullett); Merlimau and Jus (Cantley). Negri Sembilan, Bukit Sulu and Pantai (Cantley). Dindings, Pangkor. Penang, Tanjong Bunga (Curtis). Kedah, near Yan. *Distrib.* Borneo. *Native names:* Akar Rachun Tikus; Akar Buas Tungul; Akar Perindu; Akar Jutong; Akar Mulor Padang; Tunung Rimau Putih.

(8) **P. trichostoma** *Miq. Fl. Ind. Bat.* ii. 892; *Gamble, l.c.* 816. *P. parasitica* *Clarke, l.c.* iv. 574 (*not of Blume*).

Large climbing shrub, glabrous. Leaves chartaceous at length coriaceous variable ovate or obovate-elliptic to nearly orbicular, shortly acuminate, base round to sub-cuneate; nerves 5 to 6 pairs; petioles .75 to 1 in. long, puberulous. Corymbs 4 to 5 in. across, puberulous. Flowers sessile. Calyx cup-shaped, puberulous, 2-lipped, upper lip 2-lobed, lower 2-toothed or entire, .05 to .07 in. long. Corolla cream white, campanulate, .1 in. long, villous inside, sub-equally 4-lobed. Stamens long. Drupe pyriform. *Hab.* In woods, not common. Singapore, Chua Chu Kang. Johor, Batu Pahat. Pahang, Sungei Chenei (Fox). Malacca (Griffith). Perak, Sungkai (Kunstler). Lankawi (Curtis). *Distrib.* Java, Borneo.

The stiff oblong-obovate, shining leaves are very characteristic.

(9) **P. perakensis** *King and Gamble, Kew Bulletin*, 1908, p. 107; *Gamble, Journ. As. Soc. Beng., l.c.* 816.

Climbing shrub, closely resembling *P. trichostoma*, but the leaves narrower, 3 to 5 in. long, 1.5 to 2.25 in. wide, and thicker, elliptic-lanceolate; nerves glabrous; petioles .5 to .75 in. long. Corymbs puberulous, 6 in. long and wide. Bracts ovate-lanceolate, those of lower divisions leafy. Calyx 4-angled, prominently nerved pubescent. Flowers sessile. Corolla funnel-shaped, .125 in. long, green. Stamens open by circular pores, not elongate as in *P. trichostoma*. *Hab.* Perak (Kunstler).

I have not seen this.

(10) **P. punctulata** *Clarke, l.c.* iv. 575; *Gamble, l.c.* 817.

Scandent shrub. Leaves sub-coriaceous elliptic, short-acuminate, base broad, minutely puncticulate beneath; nerves rather prominent, 4 to 5 pairs beneath sparsely hairy chiefly in axils, netted reticulate; 4 to 6 in. long, 2 to 3 in. wide. Corymbs many-flowered, pubescent; branches 3, stout with peduncles 1 to 3 in. long, at base 2 lanceolate acuminate leafy bracts. Flowers

numerous, pedicelled. Calyx pubescent, funnel-shaped, nearly .1 in. long, 2-lipped, 4-lobed. Corolla tubular, .1 in. long. Stamens included. *Hab.* Rare in forests. Singapore, wood in the Economic Gardens in 1915, where it has since disappeared. Malacca (Maingay).

(11) **P. cordifolia** Roxb. *Fl. Ind.* iii. 78.

Shrub 12 ft. tall. Leaves membranous, ovate or elliptic, base rounded cuneate or rarely cordate above, slightly bullate beneath; nerves 5 pairs, elevate sunk beneath; nervules transverse sparsely puberulous chiefly above; 3 to 7 in. long, 2 to 3 in. wide; petioles .5 to 1 in. long, puberulous above. Corymbs dense, 3 in. long and as wide (often less) pubescent. Calyx tubular, .1 in. long, upper lip 2-lobed, lower entire. Corolla greyish white, .2 in. long, funnel-shaped, 2-lipped. Drupe pyriform. *Hab.* Local, chiefly in the north, Malacca, Tanjong Kling. Province Wellesley, Krian, Penang, Tanjong Bunga (Curtis). Perlis, Chupeng.

(12) **P. Wrayi** King and Gamble, *Kew Bulletin*, 1908, p. 108.

Robust climber nearly quite glabrous. Leaves stiff coriaceous, elliptic-lanceolate gradually acuminate, base narrowed often unequal shining; nerves 4 pairs beneath prominent; 4 to 8 in. long, 2 to 4 in. wide; petioles .5 to 2 in. long, rather slender. Corymbs dense, 4 to 5 in. across. Calyx deeply 2-lipped, upper sharply 2-lobed, lower 3-toothed. Drupe obovoid, .25 in. long. *Hab.* Perak, Tapah (Wray). Rare.

(13) **P. sterculifolia** King and Gamble, *Kew Bulletin*, 1908, p. 108; *Gamble, Journ. As. Soc. Beng., l.c.* 819.

Shrubby climber. Leaves membranous to chartaceous ovate acuminate, base round or cordate; nerves 6 pairs sunk above and puberulous, raised beneath; 4 to 9 in. long, 3 to 5 in. wide; petioles 2 to 4 in. long. Corymbs 6 to 9 in. long and up to 8 in. wide; branches stout. Flowers pedicelled, green. Calyx campanulate hardly 2-lipped. Corolla funnel-shaped, .125 in. long, puberulous, white-villous inside. Stamens exsert; anther-cells divaricate. Drupe globose, tubercled, .3 in. long. *Hab.* Forests, rare. Perak, Thaiping Waterfall (Wray, Kunstler).

(14) **P. Ridleyi** King and Gamble, *Kew Bulletin*, 1908, p. 109; *Journ. As. Soc. Beng., l.c.* 820.

A climbing shrub. Leaves stiffly chartaceous, ovate-oblong or oblong rounded or shortly acute at top, base round or shortly narrowed, glabrous, 1.5 to 3 in. long, .75 to 1.5 in. wide; nerves fine, little elevate; petioles .25 to .5 in. long. Corymbs 1.5 to 5 in. long, 2 to 5 in. wide, puberulous; peduncles 2 in. long. Flowers very small nearly or quite sessile, greenish white. Calyx campanulate, 4-angled, shortly 2-lipped, each lip shortly bilobed. Corolla tubular, .1 in. long, white-villous in mouth, lobes 4, equal. Stamens exsert, insert in 2 unequal pairs. *Hab.* Very rare; climbing on trees in woods, Singapore, one plant in the Garden Jungle in 1895, now gone. Perak (Scortechini). *Native name*: Kanrian.

(15) **P. Kunstleri** King and Gamble, *Kew Bulletin*, 1908, p. 109; *Gamble, Journ. As. Soc. Beng. l.c.* 821.

Large stout shrub or small tree, black bark. Leaves stiffly coriaceous elliptic-oblong or obovate blunt or shortly acuminate, glabrous; nerves stout elevate, 5 to 7 pairs; 4 to 7 in. long, 2.5 to 4 in. wide; petioles .75 to 1.25 in. long. Corymbs spreading, sub-glabrous; branchlets and calyx pubescent; peduncle 3 to 4 in. long, whole corymb 7 in. wide. Flowers greenish white, shortly pedicelled. Calyx cup-shaped, truncate or obscurely 2-lipped. Corolla tubular, .125 in. long, 2-lipped, lower lip with midlobe longest. Drupe white, obovoid ribbed, .25 in. long. *Hab.* Perak, Sungei Rayah and Goping (Kunstler). *Distrib.* Sumatra.

(16) **P. pyramidata** Wall. *Cat.* 1779; *Gamble, l.c.* 822.

A fairly big tree up to 50 ft. tall or more. Leaves chartaceous ovate acuminate cordate, round, or attenuate at base, glabrous above, glaucescent beneath, stellate-tomentose on midrib; nerves 7 to 10 pairs and transverse nervules prominent beneath; 6 to 14 in. long, 3 to 8 in. wide; petioles 1 to 4 in. long. Cymes in a pyramidal panicle stellate-pubescent, 12 in. long, 6 in. wide. Flowers crowded on branch-tips pedicelled greenish white. Calyx campanulate stellate-pubescent, teeth 5, sub-equal. Corolla 2-lipped, .15 to 2 in. long, a ring of hairs in the throat, greenish white. Drupe globose or ovoid, .2 to .25 in. through. *Hab.* Forests, Pahang, Kwala Luit, Pahang River; Kerambit, Kwala Lipis (Foxworthy). Selangor, Dusun Tua. Negri Sembilan, Johol. Perak, Temengoh; Kwala Dipang. Lankawi (Curtis). *Distrib.* Burma, Java, Timor. *Native name*: Piat.

7. GMELINA, Linn.

Small bushy tree or climbers armed with axillary spines (branchlets). Leaves opposite, entire or lobed. Flowers large, yellow in cymes, on a terminal panicle. Bracts small or rarely large and dull red. Calyx campanulate, 4- to 5-toothed. Corolla obliquely funnel-shaped, tube slender at base, abruptly dilate above; limb oblique, 4- to 5-lobed. Stamens 4, included. Ovary 4-celled, cells 1-ovuled; style slender; stigma bifid. Drupe succulent yellow; endocarp bony, 2- to 4-celled, usually with a conical hollow in the middle open on one side. Species about 11.

Trees, small.

Leaves sub-glabrous (1) **G. asiatica**

Leaves very woolly beneath (2) **G. villosa**

Scandent shrub.

Flowers in strobiles with large red bracts (3) **G. Hystrix**

(1) **G. asiatica** Linn. *Sp. Pl.* 626; *Gamble, l.c.* 823.

A small bushy spiny tree or shrub. Leaves membranous oblanceolate or obovate to rhomboid and 3-lobed, deep green above, glaucous beneath and minutely pubescent, .75 to 1.5 in. long,

·5 to 1 in. wide; nerves 2 or 3 pairs; petioles slender, ·5 in. long. Racemes fulvous tomentose. Flowers large, yellow. Calyx up to ·2 in. long, pubescent except the glands. Corolla thin, 1·5 in. long, puberulous outside. Fruit pear-shaped. *Hab.* Waste ground, roadsides, beneath coconuts, sporadic, Singapore, Gelang. Malacca, old cemetery on St. John's Hill. Negri Sembilan, Bukit Tangga Pass, roadside. Perak (Scortechini). Tringganu, sea-shore. *Distrib.* India, Java, Borneo.

I have great doubts as to this being a native here. It occurs sporadically as a shrub, and I have never seen any trace of flowers or fruit, at least south of Tringganu.

(2) **G. villosa** Roxb. *Hort. Beng.* 46; *Fl. Ind.* iii. 86; *Gamble*, l.c. 824.

Shrub or small tree, villous, spines ·5 in. long. Leaves membranous ovate sub-acute, base round or cuneate, sparsely short-hairy above, densely stellate-tomentose beneath pale, 1 to 3 in. long, 1 to 2 in. wide; petioles about 1 in. long. Racemes fulvous tomentose, 1 to 2 in. long with leafy caducous bracts. Corolla narrow part of tube, ·5 in. long, dilate part 1 in. long. Drupe sub-globose, 1 in. long, yellow pulpy. *Hab.* Common near the sea and in low woods inland, Singapore, Chan Chu Kang; Gelang. Pahang. Kwala Pahang; Temerloh (Foxworthy). Malacca, Alor Gajah (Derry); Selandor. Perak, Changkat Serdang (Wray). Penang Hill (Philipps). Kelantan, Kwala Lebir (Gimlette). Perlis, Kanga. Lankawi (Curtis). *Distrib.* Nicobars, Malaya. *Native names*: B'longoh; Bulanggan; Bulang Gajah; Bulang Kechil. *Use*: Fruit in syrup for consumption, and rubbed on the body for rheumatism.

(3) **G. Hystrix** Schultes in *Kurz, Journ. As. Soc.* xxix. (2), p. 81.

Scandent shrub, strongly spiny. Leaves elliptic sub-coriaceous, top blunt, base gradually narrowed, glabrous on both sides, paler beneath, 3 to 4 in. long, 2 in. wide; petioles ·75 in. long. Flowers in a pendulous strobilate cone, 2 to 3 in. long, of broad ovate mucronate dull red bracts. Corolla large, yellow. Fruit about 1 in. long, yellow. *Hab.* Singapore Garden Road, Tanglin, probably an escape here. Kelantan, Kampong Kota (Gimlette). *Distrib.* Siam, Tenasserim, Philippines. *Native name*: Duri Bulongan. *Use*: Fruit mixed with lime applied to the throat for cough.

8. CLERODENDRON, Linn.

Shrubs or small trees (sometimes climbing). Leaves opposite, rarely whorled, simple or lobed. Flowers usually showy, white, yellow or red in axillary cymes or terminal panicles. Calyx campanulate, 5-lobed, often enlarged in fruit. Corolla salver-shaped or funnel-shaped; limb oblique, usually 2-lipped, lobes 5. Stamens 4, didynamous long exsert; filaments filiform; anther-cells parallel.

Ovary 4-celled, cells 1-ovuled; style filiform; stigma short, bifid. Fruit a succulent rarely dry drupe separating into 4 pyrenes. Calyx often accrescent red. Endocarp bony. Seed oblong or pyriform. Species 100 or more, tropics generally.

Cymes axillary.

Cymes few-flowered, numerous; fruit dry . . . (1) **C. inerme**

Drupes pulpy.

Cymes in dense heads with conspicuous red bracts (2) **C. deflexum**

Cymes panicled terminal.

Tree glabrous; panicles lax; flowers sub-regular yellow (3) **C. disparifolium**

Panicles leafy erect; corolla under 1 in. long, salver-shaped. Shrubs scabrid hispid (4) **C. lankawiense**

Panicles long spike-like pendulous; flowers white.

Calyx-lobes lanceolate acute (5) **C. penduliflorum**

Calyx-lobes broad ovate (6) **C. umbratile**

Panicles erect dense, racemiform.

Bush. Leaves serrate; flowers cream, lower lip blue (7) **C. serratum**

Panicles broad, spreading; flowers white.

Shrub. Leaves ovate velvety (8) **C. villosum**

Panicles thyrsoid erect red or orange, many-flowered; stems bare below, shrubby.

Leaves entire, oblong.

Stem fistular; flowers 1 in. long (9) **C. myrmecophilum**

Stem fistular; flowers .5 in. long (10) **C. breviflorum**

Leaves entire ovate cordate not glandular (11) **C. squamatum**

Leaves lobed cordate, glandular beneath (12) **C. paniculatum**

Corolla over 1 to 3 in. long, funnel-shaped, white.

Leaves narrow lanceolate whorled (13) **C. siphonanthus**

Leaves elliptic or ovate opposite (14) **C. Ridleyi**

(1) **C. inerme** Benth. *Fl. Hongkong*, 271. *C. neriifolium* Gamble, *l.c.* 827 (not of Wallich).

Small twiggy bush about 3 ft. tall. Leaves membranous, elliptic acute or rounded at tip, base narrowed, glabrous (adult), 1.5 to 3.5 in. long, .75 to 1.75 in. wide; petioles .25 to .5 in. long; nerves fine, inconspicuous. Cymes axillary few-flowered. Flowers in threes on the branch-ends. Calyx campanulate enlarged in fruit. Corolla white, tube slender, cylindric, 1 in. long, villous inside, lobes about .25 in. long. Stamens long exsert, dark pink. Drupe obovoid, .5 in. long, endocarp spongy; pyrenes 4. *Hab.* Sea-coasts, common, in tidal mud. Singapore, Tanjong Katong; Changi; Pulau Ubin. Johor, Pinerong; Tanjong Kupang. Pahang, Pekan. Malacca (Maingay, Griffith). Perak, Krian (Scortechini). Kelantan, Kamposa. Penang, Batu Feringhi (Curtis). Lankawi. Perlis, Kanga. *Distrib.* Burma, Malay isles to Australia and Polynesia. *Native name*: Pawan.

(2) **C. deflexum** Wall. *Pl. As. Rar.* iii. 10, t. 215.

A little-branched shrub 2 to about 4 ft. tall, pubescent. Leaves

membranous elliptic-obovate or lanceolate acuminate or cuspidate, base slightly narrowed, blunt glabrous above, pubescent beneath, 6 to 16 in. long, 2 to 6 in. wide; petioles 1 to 2.5 in. long. Peduncle 1 to 3 in. long, deflexed, bearing one (or more) dense heads about 1.5 in. through of red bracts and bracteoles. Calyx-tube hardly .1 in. long, lobes linear-lanceolate, red. Corolla creamy white, tube .75 in. long; lobes oblong-lanceolate, .25 in. long. Stamens long exsert. Drupe purple black, pulpy globose; pyrenes pyriform. *Hab.* Common and conspicuous in woods, Singapore (Wallich); Garden Jungle; Bukit Timah, etc. Johor, Gunong Pantai. Pahang, Tahan River. Malacca, Ayer Panas; Nyalas (Derry). Negri Sembilan, Gunong Angsi; Tampin. Selangor, Rantau Panjang (Kloss). Perak, Temengoh; Tapah (Wray); Penang Hill (Curtis). *Distrib.* Pulau Battam. *Native names:* Cherit Hutan; Lidah Kerbau; Sumbong Hutan; Sumpu Kuwang; Sakacha Lima.

var. *bracteatum*. Heads surrounded by leafy bracts 1 in. long, .5 in. wide. *Hab.* Singapore, Reservoir Woods (Ridley). Selangor, Ginting Bidai (Kloss). An odd form.

(3) *C. disparifolium* *Bl. Bijdr.* 809; *Gamble, l.c.* 829.

Slender tree up to 15 or 20 ft. tall. Leaves thin, oblong or elliptic-lanceolate, glabrous long-acuminate, 2 to 7 in. long, .75 to 2.5 in. wide; petioles .5 to .25 in. long. Cymes long, slender, weak and lax puberulous, axillary and terminal, 6 in. long. Calyx campanulate, .1 in. long, lobes as long triangular acute, dull red. Corolla-tube .75 in. long; lobes narrow equal spreading, pale yellow, .25 in. long. Stamens long exsert. Drupe black surrounded by the enlarged bright red calyx. *Hab.* Common in woods, low country, Singapore, common; Garden Jungle; Tampin, etc. Johor. Pahang, Kwala Lipis (Machado); Pahang River. Malacca, Batu Tiga; Brisu (Derry). Selangor, Rawang (Curtis). Perak, Temengoh; Maxwell's Hill; Ipoh (Curtis). Province Wellesley, Bukit Panchur. Kedah, Pulau Song Song. *Distrib.* Java, Borneo. *Native names:* Guriam; Lampang or Lelampang Badak; Tudong Rumau; Sempian Petri; Sembang; Lulangring Budan; Seliguri.

(4) *C. lankawiense* *King and Gamble, Kew Bulletin*, 1908, p. 110; *Gamble, Journ. As. Soc. Beng., l.c.* 830.

Shrub 1 to 2 ft. tall, scabrid puberulous; branches 4-angled. Leaves chartaceous oblong-lanceolate acute, base narrowed; nerves beneath pubescent; 3 to 4 in. long, .5 to 1 in. wide; petioles .25 in. long. Panicle terminal thyrsoïd, 10 in. long, scabrid-pubescent; branches about 1 in. apart; peduncles about 1 in. long, ending in a few branchlets bearing few-flowered cymes. Calyx campanulate, .2 in. long, lobed half-way, lobes ovate. Corolla white, tube pubescent, .5 in. long, lobes .2 in. long, obovate midlobe longer than the rest. Stamens very slender, long exsert. *Hab.* Lankawi, Telayah Tujoh, and Terutau (Curtis); Burau (Robinson).

(5) **C. penduliflorum** Wall. Cat. 1795; Gamble, l.c. 830.

Slender shrublet about 2 ft. tall. Leaves thin ovate or lanceolate, long-acuminate, base acute, glabrous, paler beneath, 5 to 8 in. long, 1 to 3 in. wide; petioles .5 to 2 in. long. Panicle long lax pendent, up to 15 in. long, with distant pairs of branches 1.5 in. long, slender bearing 3 or 4 flowers at the ends. Calyx campanulate, lobes acute deep cut, pinkish. Corolla pure white, funnel-shaped, .5 in. long, lobes oblong spathulate, as long as the tube. Stamens exsert. Drupe black surrounded by the red enlarged calyx. *Hab.* Woods, not rare. A very charming pot plant. Selangor, Batu Caves. Perak, Batu Kurau (Scortechini). Penang, Base of Hill and Penara Bukit. Kedah, Gunong Geriang; Alor Sta. Kelantan, Chaning. Jalor, Biserat (Annandale). *Distrib.* Burma, Nicobars.

(6) **C. umbratile** King and Gamble, *Kew Bulletin*, 1908, p. 110; Gamble, *Journ. As. Soc. Beng.*, l.c. 831.

Shrub 4 to 5 ft. tall. Leaves membranous oblong to nearly obovate abruptly acuminate, base blunt or slightly attenuate, glabrous, 8 to 16 in. long, 2 to 6 in. wide; petioles 1 to 3 in. long. Panicles from upper axils long pendulous; peduncles 4 to 7 in. long; branches paired, 2 in. long; branchlets 1 in. long. Bracts leafy lanceolate. Calyx white turning red, deeply lanceolate-acuminate lobed, .5 in. long. Corolla-tube cylindric, .4 to .6 in. long; lobes spathulate as long. Stamens long, exsert. Drupe .5 in. through, black. *Hab.* Dark forests usually in mountain districts, Malacca, Bukit Kamuning (Derry). Selangor, Ginting Bidai. Perak, Thaiping Hills to 3500 ft. altitude; Kwala Dipang (Curtis); Bujong Malacca. *Distrib.* Sumatra.

(7) **C. serratum** Spreng, *Syst. Veg.* ii. 758. var. *Wallichii* Clarke in Hook. fil. *F.B.I.* iv. 592.

A bushy shrub, upper parts herbaceous; branches angled. Leaves membranous obovate-lanceolate or oblanceolate short acuminate, narrowed at base, edges serrate or nearly entire, 4 to 8 in. long, 1.5 to 3 in. wide; petioles usually short, .1 in. long, sometimes more. Panicle erect, 6 to 12 in. long, rather dense pubescent; branches and flowers many. Bracts foliaceous ovate acuminate or blunt. Calyx campanulate, lobes very short, not enlarged or spreading in fruit. Corolla-tube cylindric, .25 in. long, villous inside, lobes in 2 distinct lips, upper lip creamy white, lower pale blue, midlobe spathulate longer. Stamens curved villous at base, exsert. Drupe black, .25 in. long. *Hab.* Open country; common, Pahang, Tahan River; Pulau Tawar; Raub (Machado). Selangor, Pudoh (Goodenough); Bukit Kutu; Kwala Lumpur. Perak, Kwala Kangsa; Ipoh (Curtis). Kelantan, Kwala Lebir (Gimlette). *Distrib.* Sikkim, Burma, Cambodia, Sumatra, Java, Celebes. *Native names:* Mata Kesting; Lampin Budak. *Use:* Flowers eaten in childbirth.

(8) **C. villosum** Bl. *Bijdr.* 811; *Gamble, l.c.* 836. *C. velutinum* Wall. *Cat.* 1797.

Shrub usually 5 to 6 ft. up to 10 ft. tall, branched and bushy, villous. Leaves chartaceous ovate acuminate cordate tomentose beneath and thinly so above, 4 to 8 in. long, 3 to 5 in. across; petioles 2 in. long, tomentose. Panicle wide, 6 in. long 8 in. wide, tomentose; branches rather thick. Calyx-tube short, lobes broad acute, tomentose with large glands .25 in. long. Corolla white, tube .25 in. long, tomentose, hairy outside, lobes oblong glabrescent. Stamens long exsert. Drupe pulpy black, calyx enlarged, white. *Hab.* Common in waste ground, whole peninsula. *Distrib.* Burma, Java, Sumatra, Philippines. *Native names:* Chapah; Champening; Kasap; Tapah Kerbau; Pecha Priok Babi.



FIG. 129.—*Clerodendron myrmecophilum*

(9) **C. myrmecophilum** Ridl. *Journ. Bot.* xxxiii. 42; *Gamble, l.c.* 832; *Bot. Mag. t.* 7887.

Shrublet not or little branched; stem terete whitish fistular and tenanted by ants. Leaves thinly fleshy, glabrous oblong or oblong-lanceolate, base shortly narrowed, 6 to 12 in. long, 2 to 4 in. wide; petioles hollow, 1.5 in. long. Panicle terminal pyramidal, 10 in. long, 4 to 5 in. through. Calyx .3 in. long, cleft nearly to base, red, in fruit spreading nearly 1 in. across. Corolla-tube cylindric slender, 1 in. long, with back of petals crimson red, lobes .5 in. long, orange yellow on upper surface. Stamens long exsert, dark pink. Drupe globose, black, .5 in. through enlarged calyx red. *Hab.* In very muddy, wet spots in forests in the south, Singapore, Chan Chu Kang; Pulau Damar. Johor, Mt. Austin; Sedenah; Kukub. Perak, Thaiping (Ridley). Tringganu, Bundi (Rostados).

(10) **C. breviflorum** *Ridl. Journ. Bot.* xxxiii. 43. *C. Curtisii* *Pearson, Kew Bulletin*, 1901, p. 142; *Gamble, l.c.* 833.

Shrub little or not branched, 2 to 3 ft. tall; stem fistular, tenanted by ants. Leaves membranous fleshy elliptic or lanceolate-acute, 6 in. long, 3 in. wide; petioles 3 in. long. Panicle 6 to 12 in. long, dense; branches whorled puberulous. Calyx campanulate, lobes acuminate, .35 in. long, red. Corolla orange-colour, tube .5 in. long, lobes 2, obovate, 3 longer, narrower spathulate, .25 in. long. Stamens long exsert, 1 in. long. *Hab.* Wet, low woods, Johor, Ulu Batu Pahat (Kelsall). Selangor, Klang. Dindings, Bruas Road (Curtis). Perak, Kota (Wray).

(11) **C. squamatum** *Vah. Symb.* ii. 74.

Shrub leafy at top, about 4 ft. tall. Leaves ovate-cordate serrate minutely pubescent beneath, especially on nerves, 7 to 9 in. long, 6 in. wide; petioles 6 in. long. Panicle rather compact, 5 in. long. Calyx deeply acutely lobed, .15 in. long. Corolla-tube .5 in. long, pubescent, lobes .25 in. long, crimson scarlet. Stamens long exsert. Drupe globose black. *Hab.* Waste ground, formerly established for many years at Bukit Mandai, and Tanglin near Orange Grove, but not really wild. A very handsome plant. *Distrib.* India, China, Sumatra.

(12) **C. paniculatum** *Linn. Mant.* 90; *Gamble, l.c.* 838.

Shrub 6 to 8 ft. tall or more, leafy only at the top; stems whitish. Leaves membranous variable ovate or orbicular more or less deeply lobed, lobes acute, 3 to 7, cordate, sparsely hairy or nearly glabrous above, densely glandular beneath, 4 to 8 in. across; petioles 1 to 6 in. long. Panicle pyramidal, 12 in. long or more, 8 in. through; branches red and flowers numerous. Calyx divided nearly to base, .25 in. long. Corolla bright red, tube cylindric, slender, .5 to .7 in. long, lobes sub-equal, elliptic, .2 to .4 in. long. Stamens long exsert pink. Drupe obovate, black. *Hab.* Waste ground and forests, often cultivated. Difficult to say where it is actually wild, as pieces are carried about by the Sakai girls, who wear them in their hair, and apparently plant them by their camps. I have seen it apparently wild from and at Negri Sembilan, Bukit Sulu (Cantley). Pahang, Telom. Selangor, Semangkok Pass; Ginting Bidai. Perak, Ayer Larut (Wray). Penang, Tanjong Bunga (Curtis). Kedah (Kunstler). *Native names:* Pangil; Pankilai.

(13) **C. siphonanthus** *Br. Ait. Hort. Kew*, ed. 2, iv. 65; *Gamble, l.c.* 839.

An erect little or not branched shrub, 2 to 4 ft. tall. Leaves membranous, whorled 3 to 5 together, narrow linear-lanceolate, shortly acuminate, base narrowed, glabrous, 4 to 8 in. long, .5 to .75 in. wide; petioles 0 or very short. Panicle thyrsoid leafy, 8 to 12 in. long, lax; branches whorled, red, 3 in. long. Calyx campanulate, lobes ovate-lanceolate, .2 in. long, in fruit much

enlarged, red. Corolla-tube cylindric, funnel-shaped upwards, 3 to 4 in. long, white lobes, obovate, .3 to .4 in. long. Stamens long exsert. Drupe globose, black, calyx enlarged red. *Hab.* Wild in meadows near rivers, also occurs in damp waste ground, Singapore, an occasional escape from gardens. Pahang, Pekan River pastures. Perak, Trong (Wray). Kedah, Alor Sta. *Distrib.* India, Siam, Malay isles. *Native names* : Gunja-Gunja; Penatoh. *Use* : The leaves are smoked in place of Bhang and said to be intoxicant.

(14) **C. Ridleyi** King and Gamble, *Kew Bulletin*, 1908, p. III; Gamble, *l.c.* 840.

Shrub about 6 ft. tall (tree 10 to 15 ft. tall, *vide* Kunstler). Leaves membranous elliptic-lanceolate to ovate caudate-acuminate, base round or cuneate glabrous, 3 to 7 in. long, 1 to 3 in. wide; petioles .75 to 2 in. long, slender. Panicle small, terminal few-flowered, 6 in. long or less. Calyx-lobes lanceolate acuminate, glabrous glandular. Corolla-tube cylindric, slightly dilate at top, 3 to 3.5 in. long, lobes obovate, blunt, all white (pale yellow, Kunstler). Stamens long exsert. Drupe deep red enclosed in the enlarged calyx. *Hab.* Rare in dense wet woods, Selangor, Batu Tiga (Ridley). Perak, Larut (Kunstler).

Kunstler describes this as 10 to 15 ft. tall; I have only seen it a 6 ft. shrub.

CULTIVATED AND EXCLUDED SPECIES

- C. FRAGRANS *R. Br. Ait. Hort. Kew*, ed. 2, iv. 63. Shrub creeping and rooting with large soft foetid leaves, and double white flowers with a purplish centre very fragrant, cultivated and run wild in waste ground, origin Chinese. *Native name* : Rabu Kumbang.
- C. CALAMITOSUM *Linn. Mant.* 90. Slender white-flowered shrub from Java. Malacca (Maingay). No doubt a garden plant.
- C. THOMSONÆ *Balf. Trans. Bot. Soc. Edinb.* vii, 265, t. 7. A well-known climbing African species with ovate leaves and lax cymes of flowers, red with white calyx very often cultivated, but it only fruits on Penang Hill at 2500 ft. altitude.
- C. BALFOURI *Hort.* Resembling this with pink calyx is also cultivated
- C. INFORTUNATUM *Linn. Sp. Pl.* 637; *Gamble, l.c.* 835, Singapore (Schomburgk). Schomburgk's collection were mostly of garden plants.
- C. COLEBROOKIANUM *Walp. Rep.* iv. 114; *Gamble, l.c.* 837, Singapore (Lobb); no doubt a wrong locality for this Indian plant. I, however, did find on Gunong Berumbun near Telom a shrub in fruit which might perhaps be this; almost a tree, leaves entire deltoid; calyx in fruit large, lobes acute red.

9. VITEX, Linn.

Trees medium to big or more rarely shrubs. Leaves 3- to 7-foliate, rarely 1-foliate; leaflets unequal, mid one largest petiolulate. Flowers blue, yellow or white in terminal panicles or corymbs or axillary corymbs. Calyx campanulate or tubular truncate, 3- to 5-toothed or 2-lipped. Corolla small, 2-lipped, tube long or short, upper lip 2, lower 3-lobed, central lower lobe longest. Stamens 4, usually exsert. Ovary 2- to 4-celled; style filiform; stigma bifid. Fruit a drupe supported by the enlarged calyx. Pyrene bony, 4-seeded. Species about 120, tropics and warm regions.

Inflorescence terminal; flowers usually blue.

Petioles not winged.

Shrubs or small trees; leaves membranous, white-pubescent beneath.

Treelet; leaves 3-foliate elliptic (1) *V. trifolia*

Sandhill creeping shrub; leaves simple var. *repens*

Bush or treelet; leaves trifoliate, lanceolate acuminate (2) *V. Negundo*

Trees; leaves not grey or white beneath, 1-foliate, coriaceous.

Leaves round at base; cymes in glomerate whorls (3) *V. holophylla*

Leaves shortly, cuneate at base; cymes laxer (4) *V. Clarkeana*

Trees; leaves trifoliate.

Stiffly coriaceous; panicles stout; flowers clustered (5) *V. coriacea*

Thin membranous; panicles slender; flowers solitary, distant (6) *V. siamica*

Leaves 5-foliate.

Leaflets sub-sessile; panicle pubescent with large bracts (7) *V. pubescens*

Leaflets petiolate; panicle laxer hardly pubescent; bracts small or o. (8) *V. heterophylla*

Panicle lax spreading; cymes peduncled (8) *V. heterophylla*

Panicle little-branched; cymes in compact sessile whorls (9) *V. urceolata*

Leaves with broadly winged petioles.

Leaflets long lanceolate, under 2.5 in. across (10) *V. pteropoda*

Leaflets elliptic to obovate, over 3 in. across (11) *V. peralata*

Inflorescence axillary.

Leaves 3- to 5-foliate; cymes 4 to 5 in. long, peduncled lax; flowers white and blue. (12) *V. glabrata*

Leaves 3-foliate; cymes short sessile under 2 in. long; flowers bright yellow.

Leaves and cymes pubescent.

Calyx-lobes oblong lanceolate conspicuous, .27 in. long, equal (13) *V. longisepala*

Calyx-lobes short acute, equal .1 in long (14) *V. vestita*

Leaves glabrate; calyx 2-lipped (15) *V. gamosepala*

(1) *V. trifolia* Linn. *Sp. Pl.* 638; *Gamble, l.c.* 842.

Aromatic shrub or small tree; branches white tomentose.

Leaves 3-foliate, uppermost uni-foliate, light green, white beneath; leaflets elliptic or obovate, terminal one largest, 1 to 3 in. long, .5 to 1.25 in. wide; petioles .5 in. long. Panicles terminal, white tomentose except corolla, 3 to 5 in. long, many-flowered. Calyx campanulate, ribbed, white-tomentose, teeth very small. Corolla .25 in. long, lavender blue, lower lip larger than upper. Drupe dry, black globose, .2 in. through. *Hab.* Gardens and villages, Singapore, Pasir Panjang; Pulau Ubin (Kunstler). Pahang, Kwala Pahang. Malacca, Pulau Besar. Selangor, Kwala Lumpur; Salak Road (Seimund). Perak (Scortechini). Lankawi.

var. *repens*. Woody creeper in sandhills; stem 1 in. through; branches erect, 2 to 3 in. tall. Leaves simple orbicular-ovate, white beneath. Cymes as in type form, but flowers larger and brighter blue. Sea sand common on east coast, Pahang, Pekan; Kuantan (Watson). Kelantan, near river mouth (Ridley). *Distrib.* Of type form Indo-Malaya, Australia, Japan; sea-shore wild form, same area apparently. The two forms look so utterly unlike that they might be easily taken for two species, but the sea-shore form taken inland soon becomes the tree form. *Native names*: Lagundi; Langgundi or Langgudi. *Use*: Medicinal, for consumption.

(2) **V. Negundo** Linn. *Sp. Pl.* 638; *Gamble, l.c.* 843.

Bush about 4 ft. tall; branchlets 4-angled, tomentose. Leaves 3- to 5-foliate, terminal leaflet, largest 3 in. long, .75 in. wide, lanceolate acuminate, white-tomentose beneath; petioles 1 to 1.5 in. long. Panicles 1 to 3, terminal, 6 to 12 in. long, with numerous short branchlets 1 in. long, white-tomentose. Flowers numerous. Calyx campanulate, .05 in. long, teeth acute. Corolla pale lavender, .25 in. long or less; lower lobe longest. Drupe ovoid, .2 in. across. *Hab.* Waste ground near cultivation, not very common, probably introduced, Singapore, Bukit Timah Road near Holland Road Station; Jurong; Bukit Mandai. Tomoh (Machado). Penang, Penara Bukit; Tanjong Bunga (Curtis). *Distrib.* Indo-Malaya.

Gamble gives this as sometimes a small tree.

(3) **V. holophylla** Baker, *Kew Bulletin*, 1892, p. 25; *Gamble, l.c.* 844.

Small tree pubescent. Leaves coriaceous, simple ovate-lanceolate or oblong shortly acuminate, base round; nerves sunk above, prominent and pubescent beneath; 4 to 12 in. long, 1.5 to 4.5 in. wide; petioles .75 to 1.5 in. long, pubescent. Flowers sessile in distant whorls in simple spikes, 6 to 7 in. long tomentose. Bracts lanceolate or elliptic, .2 in. long, caducous. Calyx campanulate pubescent, 1 in. long, lobes deltoid. Corolla funnel-shaped pubescent outside, villous inside, 2-lipped, .2 in. long. Drupe globose or ovoid, .7 in. through. Calyx much accrescent

truncate, .5 in. across. *Hab.* Johor, Sungei Kahang (Kelsall). Rare. *Distrib.* Borneo.

(4) **V. *Clarkeana*** King and Gamble, *l.c.* 845. *V. simplicifolia* Clarke in Hook. *fil. F.B.I.* iv. 586 (not of Oliver).

Small tree 15 ft. tall. Leaves simple coriaceous lanceolate acuminate, base round, glabrous; nerves slender elevate; 6 to 12 in. long, 2 to 3 in. wide; petioles pointed at leaf base, .5 to .75 in. long. Panicle elongate racemiform, 12 to 18 in. long; cymes in pairs distant, 1 in. long. Calyx campanulate pubescent, .15 in. long; lobes short. Corolla .25 in. long, pubescent, yellowish green, lower lip longest. Drupe ovoid, .3 in. through, pubescent. Calyx much enlarged. *Hab.* River banks. Johor, Sungei Sembrong (Kelsall). Pahang, Pekan; Pianggu, Endau (Evans); Muar, Sungei Pauh (Fox). Dindings, Pangkor (Curtis); Bruas; Telok Sera. Perak, Bernam River (Kunstler). *Distrib.* Borneo, Papua.

(5) **V. *coriacea*** Clarke, *l.c.* iv. 586; Gamble, *l.c.* 846.

A tall tree 60 ft. high. Leaves coriaceous trifoliate; leaflets lanceolate, blunt or acute, base long-attenuate, glabrous nearly equal, 3 to 5 in. long, 1 to 2 in. wide; petiolules .25 to .35 in. long, mid-one slightly longer. Panicles 2 or 3 together, 6 to 8 in. long, branches many, about 3 in. long. Flowers violet in small distant clusters. Calyx funnel-shaped pubescent, .15 in. long. Corolla 2-lipped, .25 in. long, pubescent outside, villous inside, midlobe of lower lip ovate crenate. Drupe globose, .5 in. through, calyx enlarged. *Hab.* Forests. Singapore, Garden Jungle. Malacca, Ayer Panas and Bukit Bruang (Derry). Perak, Thaiping Waterfall (Wray); Goping (Kunstler). Kedah Peak, lower slopes. *Native names*: Jali Batu; Medang Pupei.

(6) **V. *siamica*** Williams, *Bull. Herb. Boiss, Ser. 2, v. 431*; Gamble, *l.c.* 847.

A spreading tree 30 to 40 ft. tall, 15 to 20 in. through, glabrous. Leaves coriaceous chartaceous, trifoliate; leaflets ovate-lanceolate acuminate, base cuneate; nerves 12 to 24 pairs; middle leaflet largest, 2.5 to 5 in. long, .75 to 1.75 in. wide; petioles .1 to 2 in. long; petiolules .5 in. long. Panicles 6 in. long with very many slender branches and numerous small solitary flowers, sessile or nearly so. Calyx campanulate, .05 in. long, teeth half as long, acute. Corolla-tube .1 in. long, pubescent, with yellow glands, light blue or white villous inside. Stamens included. Drupe .15 in. through, black globose. *Hab.* Limestone rocks, Selangor, Batu Caves on the top. Perak, Batu Kurau (Scortechini). Lan-kawi, Kwah (Curtis); Dayong Bunting (Fox).

(7) **V. *pubescens*** Vahl, *Symb.* iii. 85; Gamble, *l.c.* 848.

Bushy tree about 20 to 60 ft. tall; stem thick, young parts pubescent. Leaves chartaceous, 3- to 5-foliate, middle leaf largest, obovate or elliptic, blunt or acuminate, base round or cuneate, nearly glabrous above, pubescent beneath, mid-leaflet 6 to 8 in.

long, 3 in. wide; petiolules .25 in. long to 0; petioles 2 to 4 in. long. Panicles pyramidal pubescent, up to 10 in. long, 6 in. through. Bracts ovate or spatulate persistent. Calyx campanulate tomentose, .15 in. long. Corolla 2-lipped, tube pubescent, lower lobe long, violet blue. Drupe globose, .2 in. through, black. *Hab.* Very common in open country and secondary jungle from Singapore to Perlis, and Pulau Adang. *Distrib.* India, Burma, Malay islands. *Native names:* Leban; Leban hitam; Leban Tandok. *Use:* Valued for its timber, used especially for bridges.

(8) **V. heterophylla** Roxb. *Hort. Beng.* 46; *Fl. Ind.* iii. 75; *Gamble, l.c.* 848; *Wall. Pl. As. Rar.* 15, t. 226.

Tree 60 to 80 ft. tall, 2 to 3 ft. through. Leaves chartaceous, 5-foliate; leaflets elliptic-oblong to obovate, long cuspidate-acuminate, base narrowed or rounded, mid-leaflet largest, 5 to 7 in. long, 3 to 4 in. wide; petiolule .5 to 1 in. long, the others smaller with short or no petiolule; petioles 3 to 6 in. long. Panicles large lax thinly tomentose thyrsoid, 12 in. long, lower branches 6 in. or more long; cymules in distant pairs, .5 in. long. Calyx tubular, campanulate grey-pubescent, .1 in. long. Corolla broad, funnel-shaped, pubescent, glandular outside, pale yellow, lower lip blue. Drupe pyriform. *Hab.* Local. In dense forests, Perak, Tapah (Wray); Ulu Bubong and Larut (Kunstler). *Distrib.* India, Cambodia.

(9) **V. urceolata** Clarke in *Hook. fil. F.B.I.* iv. 285. *V. sumatrana* var. *urceolata* *Gamble, l.c.* 849.

Tree 40 to 60 ft. tall. Leaves chartaceous, 3- to 5-foliate; leaflets obovate or oblong obovate abrupt shortly acuminate, glabrous or nearly, mid-leaflet 4 to 6 in. long, 2.5 to 3 in. wide, with petiolule 1 in. long, other leaflets little smaller, with petiolules shorter; petioles 1.5 to 4 in. long. Panicle thinly tomentose, 3-branched sessile, up to 8 in. long, lower branchlets up to 4 in. long. Flowers in pairs of cymes distant at base, crowded above. Calyx tubular campanulate, .15 in. long, enlarged in fruit. Corolla-tube curved, .25 in. long, pubescent outside, glabrous inside, whitish blue, lobes pubescent outside only. Drupe globose, .3 in. long. *Hab.* Forests. Rare. Malacca (Griffith). Negri Sembilan, Durian Tawar (Foxworthy). Perak, Ulu Bubong (Kunstler).

(10) **V. pteropoda** Miq. *Fl. Ind. Bat. Suppl.* 567; *Gamble, l.c.* 851.

Big spreading tree, 40 to 60 ft. tall. Leaves coriaceous, 5- to 7-foliate; leaflets long-lanceolate or oblong-lanceolate, acuminate, base cuneate, lower pair only much smaller than upper ones, 4 to 20 in. long, 1 to 2.5 in. wide; petioles 4 to 7 in. long, broadly winged, wings over 1 in. wide on each side. Panicles terminal and axillary, sub-sessile, 1 ft. long; branches 4 in. long, glabrous; branchlets or cymes of few pinkish white flowers. Calyx urceolate, .1 in. long.

Corolla short, .075 to .1 in. long. Stamens hardly exsert, villous. Drupe ovoid-oblong, 1 in. long. Calyx much enlarged spreading. *Hab.* Low-lying swamps on edges of woods. Not common and rarely flowering, Singapore, Chua Chu Kang. Pahang, Pekan (Ridley). Perak, Larut (Kunstler). *Distrib.* Sumatra.

(11) *V. peralata* King, *Kew Bulletin*, 1908, p. 112; Gamble, *l.c.* 851.

Big spreading tree 30 ft. tall or more, 10 to 15 ft. through. Leaves stiff coriaceous, 5- to 7-foliolate; leaflets sub-equal, except lowest, elliptic to obovate acute, base narrowed, midlobe 6 to 20 in. long, 3 to 6 in. wide; nerves very prominent beneath; petioles 3 to 6 in. long, very broad winged, nearly 4 in. across; wings rounded; petiolules very short or 0. Panicles up to 2 ft. long on angled peduncles 8 in. long or less; branches 2 to 3 in. long with short cymules. Flowers numerous. Calyx urceolate pubescent, pink, .1 in. long. Corolla campanulate, .25 in. long, pubescent outside, villous inside, bright blue, brown marked inside. Drupe woody ovoid-conic, 1.5 in. long, 1 to 1.25 in. wide; pericarp very thick. *Hab.* In swamps near rivers, not rare, rarely flowering, Singapore, Pulau Damar. Johor, Tebrau River. Pahang, Pekan; Kota Tongkat (Evans). Malacca (Cantley). Perak, Thaiping and Goping (Kunstler); Simpang (Wray).

(12) *V. glabrata* Br. *Prodr. Fl. Nov. Holl.* 512; Gamble, *l.c.* 852.

Large tree. Leaves chartaceous digitate, 3- to 5-foliolate; leaflets sub-equal except small lowest pair, obovate-elliptic to oblanceolate blunt or acuminate, pubescent when young, glabrous except nerves beneath when adult; nerves 10 to 20 pairs, sub-parallel; petiolules terminal one .75 to 1 in., the others .25 to .5 in. long; petioles 3 to 6 in. long. Cymes axillary, corymbose, 3 to 4 in. long, lax dichotomous. Calyx campanulate, .05 to 1 in. long, pubescent outside; teeth very short acute. Corolla-tube broad cylindric pubescent outside, a ring of hairs inside at insertion of stamens, midlobe villous blue, rest white. Stamens long exsert villous. Drupe succulent ovoid or obovoid. *Hab.* Penang (Curtis). Kedah (Kunstler). Rare. *Distrib.* India, Cochin China, Java, Australia.

(13) *V. longisepala* King and Gamble, *Kew Bulletin*, 1908, p. 112; Gamble, *l.c.* 853.

Medium-sized tree brown-pubescent branches. Leaves membranous trifoliolate; leaflets ovate or elliptic, caudate-acuminate, mid-leaflet acuminate at base; petiolules .25 in. long, lateral leaflets round at base or unequal sessile or nearly so, above sparsely hispid, below pubescent, 4 to 12 in. long, 2 to 6 in. wide; petioles pubescent, 2 to 6 in. long. Cymes axillary pubescent, 1 to 2.5 in. long. Bracts lanceolate, .275 in. long. Calyx lobes villous .25 in. long. Corolla primrose yellow, tube funnel-shaped, .5 in. long,

2-lipped; midlobe of lower lip twice as long as the others. Drupe black ovoid, .3 in. long. *Hab.* Forests on mountains; not rare. Negri Sembilan, Seremban; Bukit Sulu (Cantley). Selangor, Rawang (Goodenough); Dusun Tua. Perak, Bujong Malacca; Tapah (Wray); Thaiping Waterfall (Curtis); Goping (Kunstler); Gunong Kerbau (Haniff). *Native names*: Galang Dapur; Leban Kunyit. *Use*: For making ploughs.

(14) **V. vestita** Wall. *Cat.* 1750; *Gamble, l.c.* 854.

Small tree; branchlets pubescent. Leaves membranous trifoliate, mid-leaf much the largest; leaflets elliptic, long-acuminate, bases cuneate; nerves above and beneath pubescent, otherwise sub-glabrous; 3 to 7 in. long, 1.5 to 4 in. wide; petiolule of mid-leaflet 1 in. long, of side-ones .25 in. long. Cymes opposite axillary puberulous, 2 in. long. Calyx campanulate, .1 in. long; lobes short acute saucer-shaped, truncate in fruit. Corolla cylindric, .4 to .5 in. long, yellow, upper lip shortly 2-lobed, lower 3-lobed, midlobe hardly longer. Stamens included. Drupe black oblong, .3 to .4 in. long. *Hab.* Common in lowland woods, Singapore, Bukit Timah; Jurong. Johor, Batu Pahat; Genuang. Pahang, Kota Glanggi. Malacca, Bukit Bruang; Brisu (Derry). Selangor, Rawang; Klang Gates; Bukit Kutu. Negri Sembilan, Bukit Kandong (Cantley). Penang Hill (Curtis). *Distrib.* Burma, Sumatra. *Native names*: Alban; Halban; Bangus Jantan; Leban Bunga or Leban Nasi-Nasi; Nasi Remba; Sepit.

(15) **V. gamosepala** Griff. *Notulæ*, iv. 178; *l.c. Pl. As. t.* 448, 2; *Gamble, l.c.* 855.

Small tree; branchlets hairy. Leaves chartaceous trifoliate; leaflets elliptic or ovate acuminate usually shortly, base narrowed glabrous except the puberulous nerves beneath, mid-leaflet largest, 4 in. long, 2 in. wide; petiolule .2 to .5 in. long; side-leaflets smaller, narrower, petiolules shorter; petioles 2 in. long. Cymes axillary paniced, pubescent dichotomous, 1.5 in. long, sparsely hairy or glabrous. Calyx 2-lipped ovoid, .1 in. long, upper lip oblong entire, lower 3-lipped, in fruit split on one side to base and enlarged. Corolla yellow, funnel-shaped, tube .35 in. long, midlobe below bifid, glandular. Stamens exsert, base sparsely pilose. Drupe obovoid black, .25 in. through. *Hab.* Mountain forests and low country. Malacca, Ching (Griffith). Pahang, Kuantan (Foxworthy). Selangor, Kwala Lumpur; Semangkok Pass; Menuang Gasing (Kloss). Perak, Larut (Kunstler). *Native name*: Leban Pachat.

var. *Scortechinii* Gamble, *l.c.* 856. Cymes shorter, few-flowered. Calyx much shorter. Midlobe of lower lip of corolla entire. *Hab.* Negri Sembilan, Seremban. Perak, Gunong Batu Putih (Wray) at 3400 ft. altitude; Bujong Malacca; Tapah (Wray).

var. *Kunstleri*, *l.c.* 856. Small tree. Leaves smaller, ovate abruptly acuminate, 2 to 3 in. long. Calyx 2-lipped, short, .1 in.

long, upper lip 2-lobed or entire acute or round. Corolla slender, .45 in. long; midlobe entire. *Hab.* Mountain forests, Perak, Ulu Bubong (Kunstler), Tringganu, Bundi (Rostados).

Another form with fairly large leaves and dense, many-flowered pubescent cymes, with the calyx as large as in the type form, occurs on Gunong Kerbau, Perak (Robinson) at 4000 ft. altitude. *Distrib.* Sumatra.

10. PERONEMA, Jack.

A tree, medium or rather small; branches grey-tomentose. Leaves imparipinnate; leaflets 7 to 9 pairs. Inflorescence of large corymbose panicles terminal of very numerous, small white flowers. Calyx campanulate, 5-lobed. Corolla short, 2-lipped, 5-lobed, midlobe of flower-lip largest. Stamens 2, exsert. Ovary 4-celled; cells 1-ovuled. Capsule small, globose, of 4 crustaceous valves separating from base. Seeds small. Species 1, Malay Peninsula, Borneo, Sumatra, Java.

(1) *P. canescens* Jack, *Mal. Misc.* ii. No. 7, 46; *Gamble, l.c.* 857.

Shrub to a tree of 40 ft. tall or more, bark white. Leaves rather thin, 1 to 2 ft. long; rachis winged; leaflets sessile, lanceolate, acuminate, base cuneate serrate or not, smallest ones at base 1 in. long, .5 in. wide, uppermost 9 by 2.5 in., below whitish pubescent; nerves 20 pairs. Panicles 12 in. long, 20 in. wide; puberulous. Calyx .1 in. long. Corolla pubescent inside. Capsule .125 in. wide. *Hab.* Swampy river edges, Singapore, Bukit Mandai. Pahang, Tahan River; Kwala Tembeling. Malacca (Griffith). Selangor, Kwala Lumpur (Foxworthy); Pasir Jugra (Foxworthy). Perak (Scortechini); Temengoh; Grit; Sungkai (Foxworthy). Penang Race-course. Kelantan, Chaning. *Native name:* Sungkai. *Use:* Bark (bitter) used in fever.

11. GLOSSOCARYA, Wall.

Shrubs, often scandent, grey-tomentose. Leaves ovate entire. Cymes in a dense terminal corymbose panicle; flowers sessile. Calyx 5-toothed. Corolla-tube narrow-cylindric; limb 2-lipped, 5-lobed. Stamens 4. Ovary imperfectly 4-celled, 4-ovuled. Capsule oblong widened upwards, 4-valved, valves narrow obovoid stipitate. Seed narrow oblong. Species 4, from Ceylon, Burma, Australia and Malay Peninsula.

(1) *G. premnoides* Ridl. *Journ. Roy. As. Soc. S. Br.* 59, p. 157.

Shrub. Leaves tip round, base cordate, thinly coriaceous, 2 in. long, 1.5 in. wide, above glabrous when adult; beneath nerves pubescent; petioles .25 in. long. Panicle sessile pubescent, 2 in. long, 2.5 in. wide. Calyx urn-shaped obscurely lobed. Corolla pubescent, white, tube .25 in. long, lobes 4. Capsule cylindric,

tip round, pubescent, .25 in. long. *Hab.* Open country, local. Perlis, Besih Hangat near Kanga (Ridley).

12. PETRÆOVITEX, Oliver

Climbing shrubs. Leaves simple or trifoliolate (or bipinnate). Cymes terminal or axillary puberulous spreading. Flowers very small. Calyx short, campanulate, much accrescent after flowering, then tube elongate, lobes forming oblanceolate papery wings. Corolla obliquely 2-lipped, lobes blunt incurved. Stamens 4. Ovary imperfectly 2-celled, cells 2-ovuled. Fruit capsular, oblong or cuneate. Species 4 or 5, Malay Peninsula and islands.

Pubescent; leaves trifoliolate : : : : (1) **P. Scortechinii**
 Glabrous; leaves 1- to 3-foliolate : : : : (2) **P. bambusetorum**

(1) **P. Scortechinii** King and Gamble, *Kew Bulletin*, 1908, p. 113; Gamble, *Journ. As. Soc. Beng., l.c.* 858.

Branches angled, puberulous. Leaves trifoliolate membranous ovate sub-acute, base round or cuneate (central one) sub-cordate, side ones pubescent both sides; nerves 2 to 3 in. long, 1 to 2 in. wide; petioles 1.5 to 2 in. long. Cymes pubescent, paniced, up to 6 in. long. Calyx deeply 4- to 5-lobed, lobes obovate, .25 in. long, in fruit, tube .25 in. long (enclosing fruit), lobes elliptic-oblong, .75 to 1 in. long. Corolla very small, lobes spathulate. Stamens exsert, 2 lower longer than upper. Capsule oblong or cuneate. *Hab.* Perak (Scortechinii). Very rare.

(2) **P. bambusetorum** King and Gamble, *Kew Bulletin*, 1908, p. 113; Gamble, *Journ. As. Soc. Beng., l.c.* 859.

Woody glabrous climber. Leaves sub-coriaceous 1 to 3 foliate, ovate acuminate, nerves 8 pairs, base round or short, cuneate, 3 to 4 in. long, 1.5 to 2.5 in. wide; petioles 1 to 2 in. long. Cymes in axillary panicles thyrsoïd, 4 to 5 in. long; rachis very slender. Calyx very small, .05 in. long, in fruit tube .25 to .35 in. long, ribbed, lobes .4 to .5 in. long. Corolla very small, glabrous, upper lip slightly bilobed, lower 3-lobed, greenish yellow. Fruit wedge-shaped. *Hab.* Rare. In dense bamboo forests, Perak, Ulu Kerling (Kunstler). *Distrib.* Borneo.

13. SPHENODESME, Jack

Climbing bushy shrubs. Leaves entire. Inflorescence of 3- to 7-flowered heads surrounded by 6 large bracts, in pairs on a large terminal panicle. Calyx campanulate enlarging in fruit, teeth 5. Corolla small bluish sub-regular; tube short, cylindric; lobes 5 or 6, imbricate. Stamens 5, insert in corolla-tube. Ovary 2-celled, cells 2-ovuled; style filiform; stigma bifid. Drupe globose or obovoid, included in calyx, 1- rarely 2-seeded; endocarp leathery. Seed globose. Species 10, Indo-Malaya.

- Corolla-lobes long narrow; style short; anthers included; bracts white . . . (1) *S. microstylis*
 Corolla-lobes ovate; style long, exsert; anthers exsert; bracts green or brown.
 Flower-heads of 3 flowers; bracts small . . . (2) *S. triflora*
 Flower-heads of 7 flowers; bracts large.
 Whole plant hairy; flowers dark blue . . . (3) *S. barbata*
 Whole plant nearly glabrous; flowers pale bluish (4) *S. pentandra*

(1) *S. microstylis* Clarke in Hook. fil. *F.B.I.* iv. 600. *S. ferruginea* Briquet, Engl. and Prantl. *Pflanzenfam.* iv. 3A, 181; Gamble, l.c. 861.

Climbing shrub forming sarmentose bushes; branchlets white-tomentose. Leaves chartaceous ovate or elliptic acute, base cuneate or blunt hispid above, tomentose beneath, 5.5 in. long, 2 to 3.5 in. wide; petioles .25 to .5 in. long. Panicles axillary and terminal, densely white-tomentose, 12 in. or more long and as broad. Bracts of heads spatulate, 6, white, .75 in. long. Heads 7-flowered; flowers sessile. Calyx tubular, tomentose, .25 in. long. Corolla funnel-shaped, curved, .3 in. long, whitish yellow, tomentose; lobes 5, 6 or 7, linear twisted. Stamens included; style very short. *Hab.* Open country. A showy bush. Kedah, Alor Sta. Perlis, Kanga. Setul (Ridley). Lankawi, Terutau (Curtis). *Distrib.* Burma, Tavoy, Siam.

When dried the white tomentum becomes reddish, whence Briquet's name.

(2) *S. triflora* Wight, *l.c. t.* 1478; Gamble, l.c. 861.

Climbing shrub. Leaves chartaceous, lanceolate acuminate, blunt, base cuneate, glabrous (adult), 3 to 5 in. long, 1 to 2 in. wide; petioles .25 to .5 in. long. Panicles 1 to 2 ft. long or more, pubescent, leafy, lower branches 6 in. or more long, spreading with distant cymules of 3 flowers with 6 spatulate bracts about as long as flowers, brownish red. Calyx tubular pubescent outside, villous inside, .1 in. long. Corolla dark purple, .25 in. long. Fruiting head bracts oblong, .6 in. long, brown. Drupes ovoid included in the enlarged calyx. *Hab.* Common in woods, up to about 3000 ft. altitude. Johor, Mt. Austin. Muar, Sungei Pauh. Malacca, Ayer Panas; Merlimau (Holmberg). Selangor, Ginting Bidai; Sungei Buluh. Perak, Kampar (Deschamps); Thaiping (Wray, Kunstler); Jenah (Wray). Penang, Ayer Hitam (Curtis). Lankawi (Fox). *Distrib.* Sumatra. *Native names:* Akar Bisar; Akar Risa; Akar Meruan; Akar Memali.

(3) *S. barbata* Schauer, in DC. *Prodr.* xi. 623; Gamble, l.c. 862.

Climbing shrub, rough brown-hairy. Leaves chartaceous, elliptic or elliptic-oblong, abruptly acuminate, base narrowed or round, brown-villous sparsely both sides; nerves thickly villous; 2 to 4 in. long, 1 to 1.5 in. wide; petioles villous, .2 to .3 in. long. Heads in a terminal raceme; peduncles .75 in. long, slender villous,

7-flowered with 6 spatulate bracts $\cdot 75$ in. long. Calyx campanulate, $\cdot 15$ to $\cdot 2$ in. long, brown-hairy. Corolla deep blue, cylindric, $\cdot 1$ in. long, pubescent outside. Drupe small, globose included in calyx, villous. *Hab.* Forests, not rare, Johor, Serom. Pahang, Pekan, Malacca, Merlimau (Derry). Negri Sembilan, Gunong Berumbun (Cantley). Province Wellesley, Krian. Penang (Wallich, Philipps); Telok Bahang (Curtis). Tringganu, Bundi (Ros-tados). *Native names* : Agalumul; Akar Chabang lima; Lilimbo. *Use* : Drug for rheumatism.



FIG. 130.—*Sphenodesme pentandra*

(4) *S. pentandra* Jack, *Mal. Misc.* i. 19; *Gamble, l.c.* 863.

Climbing shrub; pubescent. Leaves sub-coriaceous, glabrous, elliptic-oblong, ovate or lanceolate, acute mucronulate, base round, 2 to 7 in. long, 1 to $2\cdot 5$ in. wide; petioles $\cdot 25$ to $\cdot 5$ in. long, pubescent. Panicles axillary and terminal. Heads distant on slender peduncles 1 in. long. Bracts oblong rounded, $\cdot 75$ to $1\cdot 25$ in. long; flowers 7. Calyx campanulate, 10-ribbed, glabrous with 5 aristate short lobes and 5 teeth between them. Corolla bluish villous inside, lobes leathery round. Stamens exsert. Drupe globular. *Hab.* Common on edges of woods, Singapore, Selitar; Changi. Johor, Batu Pahat. Pahang River bank; Kwala Tembeling. Malacca, Bukit Panchur; Brisu (Derry). Negri Sembilan, Bukit

Burunang (Cantley). Perak, Selama (Kunstler). Province Wellesley, Krian; Kubang Ulu (Curtis). Penang, Telok Bahang (Curtis). Lankawi, Kwah (Curtis). Setul. *Distrib.* India, Siam, Borneo. *Native names*: Akar Lintang Ruas; Akar Sulang; Akar Tenak Rimau.

14. CONGEA, Roxb.

Climbing shrubs, usually tomentose. Leaves opposite, simple, Inflorescence panicles of 3- to 9-flowered capitate cymes surrounded by 4 large showy involucre leafy bracts usually pink, oblong or spatulate. Calyx tubular, funnel-shaped, 5-toothed. Corolla small, tube slender, 2-lipped, lobes upper 2, lower 3, upper lip largest. Stamens 4, exsert. Ovary 2-celled, 4-ovuled. Drupe obovoid, dry, 1-seeded. Species 4, Burma to Sumatra.

C. tomentosa Roxb. commonly cultivated in gardens, with bright rose-pink bracts, is a native of Burma and Siam.

(1) *C. vestita* Griff. *Notulæ*, iv. 174; *l.c. Pl. As. t.* 458, fig. 21; *Gamble, l.c.* 866.

Large climber fulvous-hairy above, red-villous beneath, 3 to 7 in. long, 1.5 to 3 in. wide; petioles .25 to .5 in. long, dense hairy. Panicles large. Bracts elliptic-obovate strongly nerved and reticulate beneath, 1.5 in. long, .75 in. wide. Calyx ribbed, .25 in. long; teeth triangular. Corolla rose pink, glabrous outside, a villous ring inside, .35 in. long. *Hab.* Very rare; thickets. Province Wellesley, Ara Kudah (Ridley). *Distrib.* Tenasserim, Mergui.

15. AVICENNIA, Linn.

Shrubs or small trees in tidal mud. Leaves coriaceous, entire. Flowers in small capitate or spicate heads of close-packed cymes or thyrsi. Calyx short, 5-lobed, not enlarged in fruit, segments ovate, coriaceous imbricate. Corolla short, cylindric yellow, lobes 4, sub-equal or posterior, lobe a little larger. Ovary imperfectly 4-celled; ovules 4. Fruit a leathery 2-valved capsule. Seed 1. All hot sea-coasts, 4 or 5 species.

Fruit ovoid.

Leaves obovate or oblong, tip round, not white beneath nor tomentose (1) *A. officinalis*

Leaves obovate round-tipped bright yellow tomentose beneath (2) *A. lanata*

Leaves lanceolate acuminate, white beneath (3) *A. alba*

Leaves obovate to lanceolate blunt, pale puberulous beneath (4) *A. intermedia*

Fruit globose; leaves elliptic blunt (5) *A. sphærocarpa*

(1) *A. officinalis* Linn. *Sp. Pl.* 110; *Gamble, l.c.* 867. *A. obovata* Griff. *Notulæ*, iv. 189.

Bush or tree about 15 to 30 ft. tall. Leaves elliptic-oblong or obovate blunt or rounded at tip, base narrowed, shining above, minutely puberulous beneath, 2 to 4 in. long, 1 to 2 in. wide;

petioles .25 to .75 in. long. Flowers sessile in small crowded heads on thick angled peduncles. Bracts thick concave. Calyx .1 to .3 in. long; lobes ovate-orbicular. Corolla ochre-yellow, tube short cylindric. Stamens exsert. Fruit 1.5 in. long, ovoid compressed beaked, grey-tomentose. *Hab.* Common in mangrove swamps. The wood not being valued for firewood, mangrove swamps near towns, as in Singapore and Province Wellesley, opposite Penang, consist almost entirely of this tree, the more valuable *Rhizophoras* having been cut out for firewood. Singapore, River Valley Road; Galang. Johor. Malacca (Griffith). Selangor, Port Swettenham (Burkill). Province Wellesley. Penang. *Distrib.* India, Burma, Malaya to Polynesia. *Native name*: Api-Api.

(2) *A. lanata* Ridl.

Small tree. Leaves obovate, blunt closely yellow-tomentose beneath, smooth above, 3 in. long, 1.25 in. wide; petioles wrinkled, .5 in. long, yellow-tomentose. Flowers in cymose heads in threes on a peduncle .5 to .75 in. long or more, tomentose yellowish. Bracts densely tomentose. Calyx-lobes tomentose outside. Corolla densely hairy outside, glabrous within, lobes reflexed, fragrant. Fruit ovoid, about .5 in. long, not beaked woolly. *Hab.* Singapore, River Valley Road (Burkill and Watson).

(3) *A. alba* Bl. *Biçdr.* 821; *Gamble, l.c.* 868. *A. resinifera* Griff. *Notulæ*, iv. 186.

Shrub or treelet. Leaves coriaceous lanceolate or acuminate, base narrowed, white beneath, 2 to 5 in. long, .75 to 2 in. wide; petioles .25 to .75 in. long. Flowers sessile in short spikes in short 2 in. long panicles. Bracts small, concave orbicular. Calyx-lobes .1 in. long. Corolla-tube very short. Stamens included. Capsule .5 to 1 in. long, lanceolate beaked, grey-tomentose. *Hab.* Less common than *A. officinalis* in mangroves and tidal rivers, Singapore, Chan Chu Kang; Toas. Johor, Pinerong. Pahang, Sungei Meyang. Malacca, Tanjong Kling. Selangor, Tanjong Bakau (Burkill); Jugra (Foxworthy). Province Wellesley. Dindings, Pangkor (Scortechini). *Distrib.* Indo-Malaya. *Native names*: Api-Api hitam; Api Putih.

(4) *A. intermedia* Griff. *Notulæ*, iv. 189.

Shrub 4 to 5 ft. tall. Leaves obovate to lanceolate, blunt or sub-acute beneath whitish, minutely puberulous, reticulations not very prominent, 3 in. long, 1 in. wide; petioles .25 in. long. Peduncles 1 to 3, puberulous, .5 in. long or less. Flowers crowded in heads .25 in. through. Sepals ciliate. Corolla, upper lobes usually entire. Fruit small, compressed apiculate, glaucous, wrinkled, cordate-ovate. *Hab.* Mangrove swamps, Malacca, Pulau Jawa (Griffith); Selangor, Klang (Watson). Dindings, Pangkor (Scortechini).

Griffith suggests that this is a hybrid between *officinalis* and *alba*, which it certainly looks like.

(5) **A. sphærocarpa** Stapf, *MS*.

Small tree. Leaves elliptic narrowed to top or round, base narrowed whitish beneath, 3 in. long, 1.5 in. wide; petioles winged above, .25 in. long. Inflorescence axillary of 2 to 3 or more flowers terminal on peduncles .30 to .75 in. long, puberulous. Calyx-lobes oblong ciliate, silky, .15 in. long. Corolla not seen. Fruit globose, not beaked, .75 in. long. *Hab.* Penang, Sungei Pinang (Curtis). *Distrib.* Siam, Philippines, China.

ORDER CVIII. LABIATÆ.

Herbs (rarely shrubs) usually aromatic with oil-glands. Stem usually 4-angled. Leaves opposite or whorled. Flowers irregular, solitary or in cymes axillary, often condensed into whorls. Calyx persistent, regular or 2-lipped, 4- to 5-lobed. Corolla gamopetalous; limb 2-lipped unequally, or 4- to 5-lobed, lobes imbricate. Stamens attached to tube usually 4, didynamous (rarely by suppression 2). Disc prominent. Ovary of 2 carpels, each 2-celled, cells free; style inserted between the lobes of the ovary; stigma bifid. Fruit of 4 dry (or Gomphostemma), fleshy nutlets, 1-seeded. Species 2800, whole world, but scarce in the tropics. (Prain, *Journ. As. Soc. Beng.* lxxiv (2), p. 699.)

Stamens 4, declinate.

Lower lip of corolla flat.

Fruiting calyx deflexed, upper tooth very large; raceme lax

Fruiting calyx sub-erect, upper lip flat; spike capitate

Fruiting calyx declinate, upper lip 3-toothed; raceme lax; flowers minute

Fruiting calyx deflexed; corolla-tube long; stamens 1 in. long

Lower lip of corolla concave or boat-shaped.

Calyx teeth sub-equal, lowest corolla-lobe much longer than the others; filaments free

Calyx 2-lipped, lower corolla-lobe much the longest.

Stamens free

Stamens connate in a tube

Stamens not declinate erect or spreading free.

Calyx-limb uniform. Anthers 1-celled; filaments bearded.

Whorls in lax spikes

Whorls in dense continuous spikes

Stamens ascending under upper lobe of corolla.

Calyx-limb 2-lipped.

Calyx-throat open after flowering; flowers in axillary whorls

Calyx-throat closed by a dorsal plate after flowering; raceme lax

1. OCIMUM

2. ACROCEPHALUS

3. MOSCHOSMA

4. ORTHOSIPHON

5. HYPTIS

6. PLECTRANTHUS

7. COLEUS

8. POGOSTEMON

9. DYSOPHYLLA

10. CALAMINTHA

11. SCUTELLARIA

- Calyx-limb uniform not 2-lipped; teeth equal.
 Anthers, longer pair 1-celled, shorter 2-celled, upper corolla-lobe short 12. ANISOMELES
 Anthers uniform, upper corolla-lip hooded over stamens.
 Calyx-teeth 6 to 10, upper corolla-lip woolly; flowers white 13. LEUCAS
 Calyx-teeth 5, sub-equal, upper corolla-lip pubescent not woolly.
 Leaves deeply lobed; calyx-teeth spiny, nutlets dry 14. LEONURUS
 Leaves large not lobed; calyx-teeth not spiny; flowers in whorls.
 Nutlets dry 15. PARAPHLOMIS
 Nutlets white drupaceous 16. GOMPHOSTEMMA
 Leaves small ovate; flowers small in dichotomous axillary cymes 17. CYMARIA
 Leaves moderate; flowers in dense panicked racemes 18. ACRYMIA

1. OCIMUM, Linn.

Strongly scented shrublets, bushy. Flowers in 6- to 10-flowered whorls spicate or racemose. Bracts small caducous. Calyx ovoid or campanulate, in fruit deflexed, 2-lipped, upper lip broad, flat, lower with 4 slender teeth, central pair longest. Corolla-tube short; limb 2-lipped, lower lip declinate entire, flat. Stamens 4, exsert. Nutlets mucilaginous when moistened. Species 60, tropics generally.

None are wild here, nor, so far as I have seen, established, but are popular as drugs, and so occur in village compounds occasionally and are often cultivated.

Pedicels as long as calyx, 2 lower calyx-teeth longer than the upper lip, soft-hairy (1) *O. sanctum*

Pedicels much shorter than calyx.

Lower teeth of calyx shorter than upper lip, often quite glabrous (2) *O. basilicum*

Lower calyx-teeth longer, glabrescent (3) *O. gratissimum*

Lower calyx-teeth soft-hairy (4) *O. canum*

(1) *O. sanctum* Linn. *Mant.* 85; *Prain, l.c.* 701.

Small bush 1 to 2 ft. tall, softly hairy. Leaves elliptic-oblong, entire or serrate, 1 to 2 in. long, .6 to 1.2 in. wide. Racemes 6 in. long; pedicels .25 in. long. Calyx .12 in. long, in fruit .2 in. long, lower lip longer than upper, teeth lanceolate, 2 lower middle ones awn-like upcurved. Corolla .15 in. long, purplish-pink. *Hab.* Singapore (Thomson). No doubt cultivated. *Distrib.* Southern Asia to Polynesia.

(2) *O. basilicum* Linn. *Sp. Pl.* 597; *Prain, l.c.* 702.

Small bushy shrublet often glabrous and purple, sometimes hairy. Leaves ovate acute generally entire small. Racemes dense, 6 to 8 in. long; pedicels very short. Calyx .2 to .3 in. long in fruit, upper lip orbicular longer than the tube, lower lip with

the central longer than the upper lip. Corolla white or purplish. *Hab.* Frequently cultivated especially by Tamils. The common form is glabrous and purple, Penang (Wallich), Malacca and Perak. *Native names* : Ruku; Selasih Antan.

(3) *O. gratissimum* Linn. *Sp. Pl.* 1197; *Prain, l.c.* 702.

Shrubby, 3 to 6 ft. tall (usually less) pubescent. Leaves elliptic-lanceolate serrate, 2·5 to 5 in. long, 1·5 to 2·25 in. wide; petioles 1 to 2·5 in. long. Racemes slender pubescent; pedicels very short. Calyx 12 in. long, lower middle teeth short, much shorter than upper lip. Corolla greenish white, pubescent. *Hab.* Penang Hills (Wallich). No doubt a cultivated plant. *Distrib.* Tropics.

(4) *O. canum* Sims, *Bot. Mag. t.* 2452.

Herbaceous pubescent. Leaves narrow ovate toothed or entire, 1 to 1·5 in. long. Spikes 3 to 8 in. long. Flowers sub-sessile, white; pedicels short. Calyx lower middle ovate-lanceolate awned, longer than the round upper ones. *Hab.* Cultivated ground.

I have seen this in Malay gardens, and Yapp sends it from Pulau Pinang, Redang islands.

2. ACROCEPHALUS, Benth.

Herbs. Flowers very small, sessile in globose or ovoid heads of whorls. Calyx ovoid tubular, base gibbous, upper lip flat entire, lower entire or 4-toothed. Corolla very short unequally 4-lobed. Stamens 4, included; style bifid. Species 10, Africa and tropical Asia.

(1) *A. capitatus* Benth. *Wall. Pl. As. Rar.* ii. 18.

Branched herb 6 to 12 in. tall, glabrous or sparingly pubescent. Leaves ovate or lanceolate, coarsely serrate narrowed and decurrent on petiole, 5 to 1 in. long, 25 in. wide. Corolla 13 in. long, pale blue. *Hab.* Very rare in open sandy country. Pahang, Pulau Tawar (one specimen) (Ridley). *Distrib.* India, Java, Borneo, China, Siam, Cambodia.

3. MOSCHOSMA, Reichb.

Herbs. Flowers minute in racemes of very small second terminal whorls. Calyx ovoid or campanulate, 5-toothed, 3 upper teeth largest. Corolla very short, upper lip shortly 4-fid, lower 4 flat lobes. Stamens 4. Style clavate capitate, tip bifid. Species 6, tropical Africa, Asia, Australia.

(1) *M. polystachyum* Benth. *Wall. Pl. As. Rar.* ii. 13.

Sub-glabrous, about 2 ft. tall; branches spreading; stem 4-angled above. Leaves ovate acuminate serrate, base deltoid, 1 to 2 in. long, 5 to 1 in. wide; petioles 25 to 1 in. long. Racemes 3 to 6 in. long, stiffly short-hairy. Calyx 2 in. long or less bristly hairy. Corolla white tinted pink. *Hab.* Rice-fields in the north, Kedah, Gunong Geriang. Perlis, Tebing Tinggi (Ridley). *Distrib.* India, Ceylon, Java, Philippines, Australia, Africa.

4. ORTHOSIPHON, Benth.

Herbs (or low shrubs). Flowers in whorls in a terminal raceme. Calyx 2-lipped ovoid or campanulate, lower lip 4-toothed, upper lip broad, membranous. Corolla 2-lipped, tube slender, lower lip entire concave, upper lip 3- to 4-fid. Stamens 4, very long exsert; filaments free; style long. Nutlets dry. Species about 60. Old World tropics.

(1) *O. stamineus* Benth. *Wall. Pl. As. Rar.* ii. 15; *Prain, l.c.* 703.

Slender herb usually 1 ft. or more tall; stems 4-angled, purplish. Leaves membranous ovate acuminate, base cuneate, edge serrate, 2 to 4 in. long, .75 to 1.5 in. wide; petioles .25 to .4 in. long. Raceme 4 to 8 in. long. Calyx campanulate, .15 in. long. Corolla puberulous white or pale violet; tube three times as long as calyx. Stamens projecting horizontally 1.5 in. beyond corolla. *Hab.* Wild in the north, cultivated only in the south, in open pastures. Perak, Bernam River (Kunstler). Lankawi. Setul (Ridley). *Distrib.* Assam, Burma, Siam, wild; Malay isles and Australia, doubtfully wild. *Native names:* Kumis Kuching; Cat's whiskers. *Use:* A very popular bedding plant; flowers usually white but violet forms occur.

5. HYPTIS, Jacq.

Herbs (or shrubs). Flowers small in dense capitate or lax cymes axillary. Calyx 10-nerved ovate or campanulate; teeth 5, sub-equal. Corolla 5-lobed, lowest lobe abruptly deflexed, edge thickened, the other erect or spreading flat. Stamens 4. Nutlets oblong or ovoid. Species 250, American, 2 introduced here.

Flowers in globose heads axillary, white . . . (1) *H. brevipes*
Flowers few in racemose cymes, violet . . . (2) *H. suaveolens*

(1) *H. brevipes* Poit. *Ann. Mus. Par.* vii, 465; *Prain, l.c.* 704.

Herb 2 to 3 ft. tall, 4-angled, hairy in young parts. Leaves ovate-oblong or lanceolate-acute serrate, base long cuneate, sparsely hairy, 2 to 3 in. long, .5 to 1 in. wide; petioles .25 to .5 in. long. Flowers in dense heads one to each leaf, .25 to .4 in. through, on peduncles .4 in. long, hairy. Bracts stiff, ciliate, .2 in. long. Calyx .1 in. long; teeth as long as bracts. Corolla .2 in. long, white. *Hab.* Common in marshes and damp, open spots, Singapore, Tanglin; Jurong. Johor, Batu Pahat. Pahang, Pekan. Malacca, Ayer Panas (Cantley). Selangor, Rawang; Kwala Lumpur. Negri Sembilan, Seremban. Perak, Thaiping. Penang (common, Curtis). *Distrib.* America, Africa, Malay isles. *Native names:* Sari Ingank; Sari hutan; Sari Enggang.

(2) *H. suaveolens* Poit. *Ann. Mus. Par.* vii, 472, t. 29, fig. 2; *Prain, l.c.* 705.

Branched herbs 2 to 4 ft. tall, very aromatic hairy. Leaves ovate sub-acute, base round or cuneate, pilose above, grey-pubescent beneath, serrulate, .75 to 3 in. long, .6 to 2 in. wide; petioles

·35 to ·75 in. long. Flowers 4 or 5 in lax racemose cymes axillary on a ·5 in. long peduncle. Calyx campanulate, ·2 in. long (in fruit ·35 in. long), strongly ribbed, mouth villous, teeth subulate shorter than tube. Corolla light violet blue, ·3 in. long. *Hab.* Dry spots, sea-shores, coconut plantations and rocks; very common, Singapore, Gelang; Kranji. Johor. Pinerong (Cantley). Pahang, Pekan. Malacca, Kesang Batu (Hervey); Selandor (Cantley). Negri Sembilan, Bukit Tumiang (Cantley). Selangor, Kwala Lumpur. Perak, Gunong Batu Putih (Wray). Kelantan, Chaning. *Distrib.* Most of the tropics. *Native names*: Malbar hutan; Sapulut; Selasih hutan.

6. PLECTRANTHUS, L'Herit.

Herbs or shrubby. Flowers small in lax paniced 6- to 8-flowered cymes. Calyx 5-toothed, 2-lipped. Corolla exsert; limb gibbous (or spurred rarely straight), 2-lipped, lower lip long, boat-shaped, upper short, 3- to 4-fid, recurved. Stamens 4; filaments free. Nutlets orbicular or oblong. Species about 100, Old World tropics to Polynesia.

(1) **P. Kunstleri** Prain, *Journ. As. Soc. Beng.* lxvi. ii. 529; *Ann. Roy. Bot. Gard. Calc.* ix. 55, p. 70.

Shrubby, 2 to 5 ft. tall, puberulous. Leaves sparsely puberulous, ovate acute, base entire cuneate, tip acuminate entire, sides crenate, ·3 to 4·75 in. long, 1·5 to 2 in. wide; petioles 1·5 to 2 in. long. Flowers in a panicle of racemes 6 in. long, 4 in. across. Pedicels ·15 in. long. Calyx ·2 in. long in fruit. Corolla greenish white, ·4 in. long. *Hab.* Local on limestone rocks, Perak, Kwala Dipang (Kunstler).

7. COLEUS, Lour.

Herbs. Flowers medium in lax paniced 6- to 8-flowered cymes. Calyx 5-toothed, 2-lipped. Corolla exsert, limb gibbous rarely straight, 2-lipped, lower lip entire, long, boat-shaped, upper 3- to 4-fid, recurved. Stamens 4, filaments connate into a sheath round the style. Nutlets orbicular, oblong or ovoid. Species about 80, tropics of Old World, Australia.

The following three species are cultivated here. *C. carnosus* Hassk., a fleshy light green aromatic herb cultivated for flavouring cups. Native of India. *C. Blumei* Benth., the coleus of gardens, Poko Ati-Ati, a native of Java. *C. tuberosus* Benth., a dwarf plant about 6 in. tall with a small aromatic tuber like a small potato, bright green leaves and pale blue flowers, cultivated especially in Kelantan as a vegetable. Native of Java.

(1) **C. atropurpureus** Benth. *Wall. Pl. As. Rar.* ii. 16; Prain, *l.c.* 706.

Herb 1 to 2 ft. tall, pubescent. Leaves ovate acute, base round, rarely cuneate, tip entire blunt, sides crenate, 2 to 4 in.

long, 1.25 to 1.75 in. wide; petioles 1 to 2 in. long. Flowers in short branched cymes .5 in. long, arranged on 1 to 3 branches 8 in. to 1 ft. long, pubescent. Calyx in fruit .2 in. long, lower teeth subulate. Corolla deep violet blue, .35 in. long, tube abruptly decurved, lower lip long. Nutlets orbicular. *Hab.* In open places, Singapore, Galang; Bukit Timah; Chan Chu Kang; Pulau Damar. Johor, Pulau Aor (Feilding). Malacca (Griffith). Pahang, Kota Tongkat (Evans). Selangor, Kwala Lumpur. Tringganu, Bundi (Rostados). Penang (Wallich). Kelantan, Kota Bharu. *Distrib.* Siam, Malaya to Polynesia.

8. POGOSTEMON, Desf.

Herbs or under shrubs strongly scented. Flowers in paniced spikes or racemes of dense-flowered head-like whorls. Calyx equally 5-toothed. Corolla small, 2-lipped, upper lip 3-lobed, lobes subequal or central longer and narrower, lower lip flat patent entire. Stamens 4, exsert, lower pair the shorter; filaments bearded. Stigma bifid. Nutlets smooth ovoid or ellipsoid. Species about 30, Indo-Malaya.

P. Cablin Benth. The Patchouli, Nilam of the Malays, is cultivated for the leaves and oil therefrom, the Patchouli of commerce. It is not known wild and very rarely flowers. The leaves are thicker, larger and more pubescent than *Heyneanus* and the flower whorls thicker and denser, the flowers larger.

(1) *P. Heyneanus Benth.* Wall. Pl. As. Rav. i. 31; *Prain, l.c.* 707.

Aromatic weak-branching herb, 2 to 3 ft. tall, sparsely pubescent. Leaves thin, membranous sparsely pubescent, ovate acute, base cuneate crenate, 2.5 to 4 in. long, 1.5 to 2.75 in. wide; petioles 1 to 1.5 in. long. Flowers in whorls on a simple or branched terminal spike 3 to 8 in. long, whorls .25 to .75 in. through, crowded at top. Calyx .15 in. long, pubescent; teeth triangular similar. Corolla .2 in. long, white tinted violet, glabrous except some hairs on lower lip. Filaments exsert bearded. Nutlets wide ovate. *Hab.* Banks of streams in forests, Johor, Kota Tinggi. Malacca (Griffith). Negri Sembilan, Bukit Tumiang (Cantley). Selangor, Rawang. Perak, Temengoh. *Distrib.* India, Ceylon (cultivated), Borneo. *Native names:* Rumput Kuku; Nilam Bukit; Indian Patchouli.

Rarely if ever cultivated as *Prain, l.c.*, suggested, but bits are carried about by Sakais, and the plants are to be found near their deserted camps.

9. DYSOPHYLLA, Bl.

Herbs. Leaves opposite or whorled. Flowers very small in long dense spikes of numerous close-set cymes. Calyx minute ovoid, 5-toothed, both equal. Corolla minute; limb equally 4-fid,

upper lip entire or notched. Stamens 4, exsert; style bifid. Nutlets ovoid or oblong. Species 15, tropics of Old World to Australia.

Leaves opposite ovate or lanceolate; spike 1 . . . (1) *D. auricularia*
 Leaves whorled, linear; spikes several . . . (2) *D. verticillata*

(1) *D. auricularia* Bl. *Bijdr.* 826; *Prain, l.c.* 710.

Coarse, hairy herb about 3 ft. tall. Leaves membranous ovate and lanceolate coarsely serrate, hairy, base cuneate, 1 to 2.75 in. long, .5 to 1 in. wide; petioles .1 to .4 in. long. Spike villous, terminal, 2 to 6 in. long, densely covered with cymes. Corolla .1 in. long, lavender. *Hab.* Common in damp spots in open country, Singapore, Chan Chu Kang; Ang Mo Kio. Johor, Kwala Kahang (Kelsall); Kukub. Pahang, Pekan. Malacca, Panchur; Bukit Bruang. Negri Sembilan, Seremban (Cantley). Selangor, Rantau Panjang (Kloss). Perak, Thaiping (Wray). Kelantan, Kamposa; Chaning. Tringganu, Bundi (Rostados). Lankawi (Curtis). Perlis. Kanga. *Distrib.* Indo-Malaya. *Native names:* Poko Awi Tana; Ekor Kuching. *Use:* For colic. Leaves powdered with lime (chunam) rubbed on the abdomen.

(2) *D. verticillata* Benth. *Wall. Pl. As. Rav.* i. 30.

Fleshy glabrous herb, simple or with strict branches, about 2 ft. tall. Leaves linear, whorled, 1.5 to 2 in. long, .1 in. across, obscurely toothed, sessile. Spikes numerous tomentose, 1 to 3 in. long, cylindric blunt. Flowers very small. Calyx-teeth spreading stellate in fruit. *Hab.* Northern parts in rice-fields, Lankawi (Curtis). Perlis, Kanga (Ridley). *Distrib.* Bengal to Tenasserim, Cambodia, Philippines, Australia.

10. CALAMINTHA, Moench.

Herbs (or shrubs). Flowers small or medium, densely or loosely axillary spicate or panicked whorls. Calyx 13-nerved, 2-lipped, upper lip 3-toothed, lower 2-toothed. Corolla-tube straight, throat villous, lower lip spreading, 3-lobed, upper lip erect. Stamens 4, ascending under upper lip. Nutlets minute subglobose. Species 40, north temperate regions.

(1) *C. gracilis* Benth. *DC. Prodr.* xii. 232; *Prain, l.c.* 711.

Very slender creeper ascending, about 1 ft. tall, nearly glabrous. Leaves in distant pairs, ovate blunt serrate, base shortly narrowed, glabrous, .4 to .6 in. long, .3 to .5 in. wide; petioles .25 in. long. Flowers in distant whorls of about 10, on a terminal spike, pubescent. Pedicels slender, .1 in. long. Calyx .12 in. long (in fruit .17 in. long) upper lip shortly 3-toothed. Corolla .2 in. long. *Hab.* Very local in open fields, Perak, Thaiping in fields at base of hill abundant (Ridley). *Distrib.* Assam, Java.

11. SCUTELLARIA, Linn.

Herbs (or undershrubs). Flowers in long narrow racemes. Calyx campanulate, 2-lipped closed after flowering; tube with a dorsal plate or pouch, 2-partite, upper segment deciduous in fruit. Corolla 2-lipped; tube long usually abruptly recurved beyond calyx and ascending dilate above, lower lip wide, 3-lobed, upper hooded usually blue. Stamens 4, upper pair shorter, ascending under the upper lip, lower stamens 1-celled. Nutlets obovoid papillose. Species 90, Europe, India, China, Malaya.

(1) *S. discolor* Colebr. Wall. Pl. As. Rar. i. 66.

Slender creeping, ascending herb, 6 to 12 in. tall, little or not branched pubescent. Leaves elliptic or ovate blunt crenate cordate or round at base, 1.5 to 2 in. long, .75 to 2.5 in. wide; petioles 1 to 3 in. long. Raceme terminal, 2 to 8 in. long, pubescent; flowers distant opposite or alternate; pedicels .1 in. long. Calyx .12 in. long. Corolla bright violet blue, .5 to .6 in. long. *Hab.* Mountains; not common, 4000 ft. altitude, Pahang, Telom. Perak, Gunong Kerbau (Haniff); Sira Rimau (Yapp). Kedah Peak. *Distrib.* India and Java.

12. ANISOMELES, R. Br.

Coarse-branched, strong-smelling herbs or almost shrubby. Flowers medium size in axillary whorls. Calyx ovoid or tubular equally 5-toothed. Corolla-tube short, lower lip broad, spreading, midlobe notched. Upper lip erect entire. Stamens exsert. Species 8, Indo-Malaya, Australia.

Leaves hairy, broad ovate serrate (1) *A. ovata*

Leaves narrow oblong-lanceolate serrate, white-tomentose (2) *A. malabarica*

(1) *A. ovata* R. Br. Ait. Hort. Kew, ed. 2, iii. 364; Prain, l.c. 715.

Stout plant 2 to 3 ft. or more tall, usually tomentose, but variable (never quite glabrous); stems 4-angled. Leaves thick herbaceous ovate acute, truncate, cuneate or cordate at base, crenate serrate, 1.5 to 3 in. long, 1 to 1.5 in. wide, or larger; petioles .6 in. long. Flowers in distant, dense whorls, 1 in. through, crowded at the top into a spike, hairy. Calyx .25 in. long, teeth lanceolate-acute, hairy. Corolla .6 in. long, pink. *Hab.* Waste ground, not very common, Singapore, Tanglin. Malacca (Cuming). Selangor, Kwala Selangor; Kwala Lumpur. Penang, by the coast (Curtis). *Distrib.* Indo-Malaya, China. *Use:* An excellent bee plant easily grown and very popular with hive bees.

(2) *A. malabarica* R. Br. Bot. Mag. t. 2071; Prain, l.c. 716.

Erect shrubby plant densely white-tomentose, 4 to 6 ft. tall; stems 4-angled. Leaves thick herbaceous tomentose, white beneath, oblong-lanceolate acute, base cuneate, edge serrate, 2.5 to 4 in.

long, .75 to 1.75 in. wide; petioles .5 in. long. Flowers in dense whorls 1.25 in. across or less, woolly. Calyx .3 in. long. Corolla .8 in. long, dark purple. *Hab.* Waste ground. No doubt introduced, Penang (Wallich); Ayer hitam at Tat's Corner (Curtis). *Distrib.* India, Ceylon.

13. LEUCAS, R. Br.

Herbs, shrubby or not. Flowers medium in dense terminal axillary whorls. Calyx 10-nerved; teeth 6 to 10. Corolla white, upper lip erect, concave, villous, lower lip trifid, midlobe large. Stamens 4, upper pair shorter, ascending, under upper lobe. Nutlets ovoid. Species about 100, tropics.

Whorls numerous axillary; corolla small (1) *L. martinicensis*

Whorls terminal few; corolla conspicuous.

Hairy plant with lanceolate leaves .25 to .5 in.
across

(2) *L. zeylanica*

Finely puberulous; leaves narrow linear lanceolate (3) *L. lavandulifolia*

(1) *L. martinicensis* R. Br. *Prodr.* 504; *Prain, l.c.* 718.

Herb 4 ft. tall; stems 4-angled shortly hairy. Leaves ovate-lanceolate or lanceolate acuminate, coarsely serrate, 2.5 to 3.5 in. long, 1 to 1.75 in. wide; petioles .4 to .7 in. long, all hairy. Whorls of flowers axillary, numerous, .75 to 1.25 in. through. Calyx .4 in. long, tubular curved, pubescent, teeth 10, lanceolate spined. Corolla .35 in. long, white, lateral lobes of lower lip broader than the bifid central one. *Hab.* Rare, probably a stray weed. Perak (Scortechini). *Distrib.* Tropics, both worlds.

(2) *L. zeylanica* R. Br. *Prodr.* 504; *Prain, l.c.* 719.

Branching herb, 6 to 12 in. tall; stems slender, 4-angled, hairy, pale beneath ovate-lanceolate to lanceolate sparsely serrate, base long-cuneate, 1.5 to 3 in. long, .25 to .5 in. wide; petioles .1 to .2 in. long. Flowers sessile in terminal heads, .75 in. through with 6 to 8 narrow leaves at the base. Bracts .25 in. long, spiny linear. Calyx turbinate, .2 in. long; mouth oblique, 10-nerved, teeth 8. Corolla .5 in. long, white, tube straight pubescent at top, midlobe large, clawed. *Hab.* Waste ground, coconut plantations, roadsides, very common. Singapore and Johore. Pahang, Pekan, Malacca (Griffith). Perak, Telok Anson. Penang coast (Curtis). *Distrib.* Indo-Malaya. *Native name:* Katumbit. *Use:* As a cure for scabies.

(3) *L. lavandulifolia* Sm. *Rees, Cyclop.* xx. 2; *Prain, l.c.* 719.

Branched, slender herb 6 to 12 in. tall, 4-angled, puberulous. Leaves herbaceous, linear-lanceolate, base long attenuate, sparsely serrate, 2 to 2.5 in. long, .2 in. wide; narrowed to base or with petiole distinct, .2 in. long. Flowers in axillary and terminal whorls with narrow leaves round them, .4 to .6 in. across. Calyx

·35 in. long, tube curved, very oblique with a large acute spined tooth above. Corolla white, ·5 in. long, upper lip oblong, white woolly, lower lip midlobe large obovate round. *Hab.* Common, but less so than *zeylanica*, in waste ground, coconut estates, etc. Singapore, Mt. Faber; Gelang. Malacca Hill. Penang, Penara Bukit (Curtis). *Distrib.* India, Malay isles, Java to Philippines.

14. LEONURUS, Linn.

Stout leafy herbs. Leaves lobed. Flowers medium or small in axillary dense-flowered distant whorls. Calyx 5-nerved, turbinate, teeth spiny, spreading. Corolla, upper lip entire, lower trifold, midlobe obcordate. Stamens 4. Nutlets triquetrous. Species 10, temperate and sub-temperate regions.

(1) *L. sibiricus* Linn. *Sp. Pl.* 584; *Hook. F.B.I.* iv. 678; *Prain, l.c.* 720.

Stout herb nearly or quite glabrous, 12 to 24 in. tall (or more), stem 4-angled. Leaves palmate or pinnati-partite below, 3 in. long, 2 in. across above, lobes linear, or at top simple linear, 1·5 in. long, ·15 to 2 in. wide; petioles ·25 in. long or less, all pale beneath. Whorls numerous, ·5 in. through. Bracts reduced to spines. Calyx ·2 in. long, teeth spines pubescent. Corolla ·35 in. long, pubescent, pink. *Hab.* Waste places near gardens, often cultivated by Chinese, Singapore and Malacca (Thomson and Griffith in 1845). Pahang, Pekan. Selangor, Pudo (Good-enough). Rahman, Kota Bharu (Yapp). *Distrib.* All the warm parts of the world. *Native names*: Tebung Aga; Seranting.

15. PARAPHLOMIS, Prain

Large herbs or shrubs. Leaves membranous. Flowers yellow (or white) in dense axillary whorls; bracts numerous filiform. Calyx 10-nerved equally 5-toothed. Corolla upper lip pubescent outside, glabrous inside, lower lip spreading, 3-lobed. Stamens 4, ascending under upper lip, lower longer; style bifid. Nutlets obovoid triquetrous below. Species 3, Indo-Malayan.

(1) *P. rugosa* Prain, *Ann. Roy. Bot. Gard. Calc.* ix. i. 60; *Journ. As. Soc. Beng., l.c.* 791.

Coarse shrubby plant 2 to 3 ft. tall; stems minutely hairy. Leaves glabrous or sparsely hairy above elliptic-ovate, long acuminate, base cuneate toothed, 6 to 8 in. long, 3 to 4 in. wide; petioles slender, 2 to 4 in. long. Flowers in axillary whorls chiefly below leaves, ·75 to 1·25 in. through. Calyx ·4 in. long, obconic, campanulate, teeth narrow. Corolla yellow, 1 in. long. Nutlets ·25 in. long. *Hab.* Rocky jungle, Pahang, Telom (Ridley). Perak, Waterloo (Curtis); Maxwell's Hill; Kinta (Kunstler). *Distrib.* India, Cambodia, Malay islands.

16. GOMPHOSTEMMA, Wall.

Robust half-shrubs with large leaves hairy, often with stellate hairs and usually white and reticulate beneath. Flowers large or medium in whorls often below the leaves rarely (*Curtisii*) lax cymose. Calyx campanulate, 10-nerved, equally 5-toothed. Corolla-tube slender, inflate above, usually large white or yellow, upper lip galeate, lower lip broadly 3-lobed. Nutlets white, drupaceous. Species 26, Indo-Malaya.

Corolla-tube nearly straight, throat narrow; nutlets solitary.

Calyx-teeth triangular; corolla very slender small, yellow

Calyx-teeth long, subulate; corolla large, yellow . . . (1) *G. microcalyx*
Corolla-tube curved, thickened above; nutlets 4. . . (2) *G. crinitum*

Flowers in axillary whorls; calyx grey-tomentose.

Corolla yellow; style hirsute (3) *G. Scortechinii*

Corolla white; style glabrous (4) *G. oblongum*

Flowers at base of stem in lax cymes; calyx red not tomentose (5) *G. Curtisii*

(1) *G. microcalyx* Prain, *Journ. As. Soc. Beng.* lix. ii. 316; lxxiv. l.c. 723; *Ann. Bot. Gard. Calc.* iii (2), 251, pl. 84.

Stout herb 3 to 4 ft. tall, hoary-pubescent. Leaves oblong ovate acute, base cuneate, above minutely toothed, finely pubescent both sides, hoary beneath and reticulate, .4 to .5 in. long, 3 to 3.5 in. wide; petioles 1.5 to 2 in. long. Flowers few in tomentose small whorls below, leaves .35 in. across. Calyx .3 in. long; teeth triangular shorter than tube. Corolla-tube very slender, 1.25 in. long, orange yellow. *Hab.* Local in dense mountain forests, Perak, Tapah (Wray); Ulu Bubong (Kunstler); Bujong Malacca.

(2) *G. crinitum* Wall. *Cat.* 2159; Prain, l.c. 723; *Ann. Bot. Gard. Calc.* iii (2), 254, pl. 88.

Rather woody 3 to 4 ft. tall, hoary-pubescent. Leaves elliptic, short acuminate, base cuneate, entire or serrulate above short hairy, beneath grey tomentose, 8 to 12 in. long, 2.5 to 5 in. wide; petioles 1.5 in. long. Cymes rather lax, tomentose, 2 in. long, numerous. Bracts .5 to .75 in. long. Calyx as long; teeth long linear, subulate. Corolla 1.25 in. long, yellow. *Hab.* Mountain forests 1000 to 5000 ft. altitude, Johor, Bukit Jitan. Pahang River to Kuala Tembeling; Kuala Tahan. Selangor, Ulu Selangor; Ginting Peras. Sungei Ujong (Cantley). Perak, Temengoh; Ipoh (Curtis); Kamuning; Thaiping Hills; Gunong Kerbau (Robinson). Penang (Wallich).

var. *Griffithii* Prain, l.c. 724; *Ann. Bot. Gard. Calc. l.c.* pl. 89. Outer bracts lanceolate. Leaves stellate pubescent on the back. Malacca, Chabau and Mt. Ophir (Griffith). Selangor, Batu Caves. Perak, Hulu Kwanga (Scortechini) and Gunong Hijau. *Distrib.* Tenasserim. *Native name:* Munjulung Bukit. *Use:* A decoction administered after confinements.

(3) *G. Scortechinii* Prain, *Journ. As. Soc. Beng.* lix. ii. 315; lxxiv, l.c. 724; *Ann. Bot. Gard. Calc.* iii (2), 260, pl. 93.

Coarse herb 3 to 5 ft. tall, woody. Leaves elliptic-oblong or obovate acute, long or short cuneate serrate hairy above, stellate pubescent beneath, 6 to 12 in. long, 3 to 6.5 in. wide; petioles absent or up to 1 in. long. Whorls dense axillary. Calyx .75 in. long, ribbed hairy; teeth lanceolate about as long or longer than the tube. Corolla 2.25 in. long, yellow, incurved, limb .35 in. across. Style hairy at top. *Hab.* Forests, usually at some altitude, Perak, Larut (Kunstler); Gunong Tujok (Scortechini). Kelantan, Chaning. *Distrib.* Tenasserim.

Scortechini's locality is probably meant for Gunong Hijau on the top of the Thaiping Hills.



FIG. 131.—*Gomphostemma oblongum*.

(4) *G. oblongum* Wall. *Cat.* 2154; Prain, l.c. 725; *Ann. Bot. Gard. Calc.* iii (2), 261, pl. 95.

Plant 3 to 5 ft. tall, woody tomentose. Leaves elliptic or oblanceolate, sparsely hairy above, stellate grey-pubescent beneath, strongly serrate above, narrowed to base, 6 to 12 in. long, 2 to 3.5 in. wide; petioles .35 to 1 in. long or less. Whorls of flowers rather lax. Calyx .5 in. long; teeth triangular acuminate shorter than tube, strong-ribbed pubescent. Corolla white, 1.75 in. long, stellate hairy; style glabrous. *Hab.* Mountain forests, Johor, Bukit Soga, near Batu Pahat. Pahang, Pulau Tawar woods; Telom. Kedah Peak (Robinson). *Distrib.* India, Indo-China.

var. *setosa* Ridl. Leaves oblanceolate, 12 in. long by 4 in.

wide, above sprinkled with long bristly hairs, beneath very sparsely dotted with minute stellate hairs; nerves pubescent stellate. Calyx and corolla as in type but smaller. *Hab.* Selangor, Semangkok Pass (Ridley).

(5) *G. Curtisii* *Prain, Journ. As. Soc. Beng.* lix. ii. 315; lxxiv. 725; *Ann. Bot. Gard. Calc.* iii (2), 266, pl. 92.

Woody stout below, 3 to 4 ft. long, scurfy puberulous. Leaves ovate or oblong-ovate serrate, sub-acute, base cuneate, sparsely minutely hairy above, grey minutely stellate-pubescent below, 3 to 5 in. long, 2 to 2.75 in. wide; petioles 1.25 to 4.5 in. long. Flowers many in lax cymes 2 in. long at the lower part of the stem. Calyx .5 in. long, red, glabrescent not ribbed, minutely sparsely hairy; teeth lanceolate subulate as long as tube. Corolla white, 1 in. long, sparsely puberulous, limb .3 in. long. *Hab.* Dense mountain forests, Pahang, Telom (Ridley). Perak, Thaiping Hills; Waterloo (Curtis); Gunong Batu Putih (Wray).

17. CYMARIA, Benth.

Herbs or shrublets. Flowers small in many-flowered axillary cymes forming a terminal thyrsoid panicle. Calyx 10-nerved, 5-toothed urceolate in fruit. Corolla-tube straight exsert; limb 2-lipped, lower lip 3-lobed, midlobe larger than the side lobes, upper lip arched, erect. Stamens 4, ascending. Nutlets with a large lateral scar. Species 3, Indo-China, Malaya.

(1) *C. dichotoma* *Benth. Wall. Cat.* 2080; *Prain, l.c.* 726.

Shrubby herb; stems slender finely pubescent, 1 to 2 ft. tall. Leaves ovate or rhomboid faintly crenate or entire, base acuminate sparsely minutely hairy above, pubescent beneath, 1.5 to 3.5 in. long, 1 to 2.25 in. wide; petioles .75 or 1 in. long. Cymes once or twice dichotomously branching, 3 in. long; flowers numerous distant, secund, small, yellow. Calyx .08 in. long. Corolla .16 in. long, pubescent outside. Nutlets obovoid shortly hairy on tip. *Hab.* Limestone rocks, Perak, Lenggong; Ulu Temengoh; Ipoh (Curtis). Kedah, Gunong Geriang. Perlis, Bukit Lagi near Kanga (Ridley). *Distrib.* Burma.

18. ACRYMIA, Prain

A low undershrub. Flowers small in many-flowered paniced racemes axillary. Calyx tubular equally 5-lobed, 10-nerved urceolate in fruit. Corolla-tube longer, slightly enlarged above, 2-lipped, upper lip short bifid, lower larger, 3-lobed; midlobe wider, round. Stamens 4, upper pair shorter; anthers 1-celled; stigmas unequal. Nutlets obovoid. Species 1.

(1) *A. ajugiflora* *Prain, Kew Bulletin*, 1908, p. 115; *l.c. Pl.* 2946; *Journ. As. Soc. Beng.* lxxiv. 878.

Low creeping undershrub rooting; stem 2 to 3 in. long, leafy

above. Leaves elliptic dark green, blunt, bullate bluntly serrate, base narrowed hairy, 4·5 to 8 in. long, 2 to 3·5 in. wide; petioles ·75 to 2 in. long; peduncles hairy, ·75 to 1·25 in. long. Racemes 2 in. long or less, dense. Calyx ·08 in. long, hairy, tubular, campanulate, lobes 5, short acute. Corolla ·25 in. long, upper lobes yellow ovate, lower lip much larger, 3-lobed, 2 side lobes yellow, central much bigger, round, white with a purple spot at the base. *Hab.* Limestone rocks, Selangor, Kanching (Ridley). Perak (Kunstler).

EXCLUDED; IN GARDENS ONLY

MENTHA JAVANICA *Bl. Bijdr.* 826. The local garden mint, probably only a form of the cultivated mint. Often cultivated, it occurs also in Ceylon and the Malay islands.

LEONOTIS NEPETIFOLIA *R. Br. Ait. Hort. Kew*, ed. 2, iii. 409. A herb 6 to 7 ft. tall with large whorls 2 in. across of orange scarlet flowers 1 in. long, occasionally to be seen near gardens, probably an African plant.

SALVIA COCCINEA *Juss.* The well-known red *Salvia* of gardens and *S. plebeia* *R. Br.*, an Indian field weed with small inconspicuous flowers, are given by Prain, *l.c.* 712 to 713, as escapes. The first has never succeeded in establishing itself, though in every garden. Of the second I have seen no specimens at all from our region.

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<i>lucida, Benth.</i>	357	<i>Vaccinium, Linn.</i>	206	<i>Beccarii, G. & K.</i>	2
<i>Maingayi, Hook. fil.</i>	357	<i>acuminatissimum,</i>		<i>longistamineum,</i>	
<i>malaccensis, Hook.</i>		<i>Miq.</i>	210	<i>Ridl.</i>	2
<i>fil.</i>	357	<i>ardisiflorum, Ridl.</i>	209	<i>lutescens, Bl.</i>	2
<i>reticulata, King</i>	358	<i>ardisioides, Ridl.</i>	209	<i>sambucinum, Bl.</i>	1
<i>torulosa, Hook. fil.</i>	358	<i>bancanum, Miq.</i>	209	<i>sundaicum, Miq.</i>	2
<i>Urophyllum, Wall.</i>	65	<i>breviflos, Ridl.</i>	208	<i>villosum, Ridl.</i>	2
<i>Blumeianum, Hook.</i>		<i>decorum, Ridl.</i>	207	<i>Villarsia, Vent.</i>	434
<i>fil.</i>	67	<i>eburneum, Ridl.</i>	209	<i>aurantiaca, Ridl.</i>	435
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<i>corymbosum,</i>		<i>fil.</i>	211	<i>rosea, Linn.</i>	340
<i>Korth.</i>	67	<i>glabrescens, King</i>	208	<i>Vitex, Linn.</i>	630
<i>ferrugineum, King</i>	67	<i>Hasselti, Miq.</i>	209	<i>Clarkeana, King</i>	632
<i>glabrum, Wall.</i>	68	<i>Kunstleri, King</i>	209	<i>coriacea, Clarke</i>	632
<i>Griffithianum,</i>		<i>longibracteatum,</i>		<i>gamosepala,</i>	
<i>Hook. fil.</i>	69	<i>Ridl.</i>	208	<i>Griff.</i>	635
<i>hirsutum, Hook. fil.</i>	66	<i>loranthifolium,</i>		<i>glabrata, Br.</i>	634
<i>lasiocarpum, Ridl.</i>	66	<i>Ridl.</i>	208	<i>heterophylla, Roxb.</i>	633
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<i>fil.</i>	66	<i>microphyllum,</i>		<i>longisepala, King</i>	634
<i>macrophyllum,</i>		<i>King</i>	213	<i>negundo, Linn.</i>	631
<i>Korth.</i>	66	<i>perakense, Ridl.</i>	207	<i>peralata, King</i>	634
<i>parviflorum, Wall.</i>	67	<i>pubicarpum, Ridl.</i>	211	<i>pteropoda, Miq.</i>	633
<i>potatorum, King</i>	87	<i>sabuletorum, Ridl.</i>	210	<i>pubescens, Vahl.</i>	632
<i>sessiliflorum, Ridl.</i>	69	<i>Scortechinii, King</i>	207	<i>siamica, Will.</i>	632
<i>streptopodium,</i>		<i>Teysmanni, King</i>	207	<i>simplicifolia,</i>	
<i>Wall.</i>	67	<i>viscifolium, King</i>	207	<i>Clarke</i>	632
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<i>Miq.</i>	68	<i>lancifolia, Hook. fil.</i>	352	<i>urceolata, Clarke</i>	633
<i>villosum, Jack</i>	65			<i>vestita, Wall.</i>	634

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ERRATA AND CORRIGENDA.

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- P. xviii, line 15 and elsewhere, *for* Rostado, read Rostados.
P. xviii, line 36, *for* Charles, read Cecil.
P. xix, line 5, *for* J. C. Evans of the Forest Department, read J. H. N. Evans, of the Museum Department.
P. xxxiii, after cxliii. AMARYLLIDACEÆ, etc., add: cxliii (2) BURMANNIACEÆ, small, often saprophytic herbs. Stamens 6, included in the urceolate corolla-tube; filaments very short or o. Fruit capsular.



Miccoschymanthus
dischidioides, Rehl!

Deschmannanthus

Juniper *Taken*

sepals lanceolate
acuminate with
long plumbeous hairs 5
Petals 5 ob-oval
acuminate acutius
hairy much shorter
fil. nearly filiform
Stamens 5 allanate
anthers oblong 8
filament 1/2 shorter
ovary cylindrical
stigma discoid

Gymnera
flava
Temengoh

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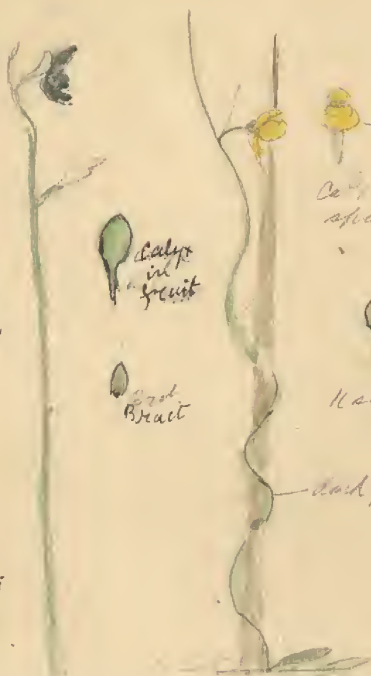
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Lexocarpus
sernitata Nutt.
 Microphis violet

Utricularia
griffithii

345 *



leaves yellow
 Corolla lanceolate, green
 after nearly abraded
 Calyx in fruit
 Pod. Bract
 H. caudex
 dark green

Utricularia *Wittichiana*
 Microphis

